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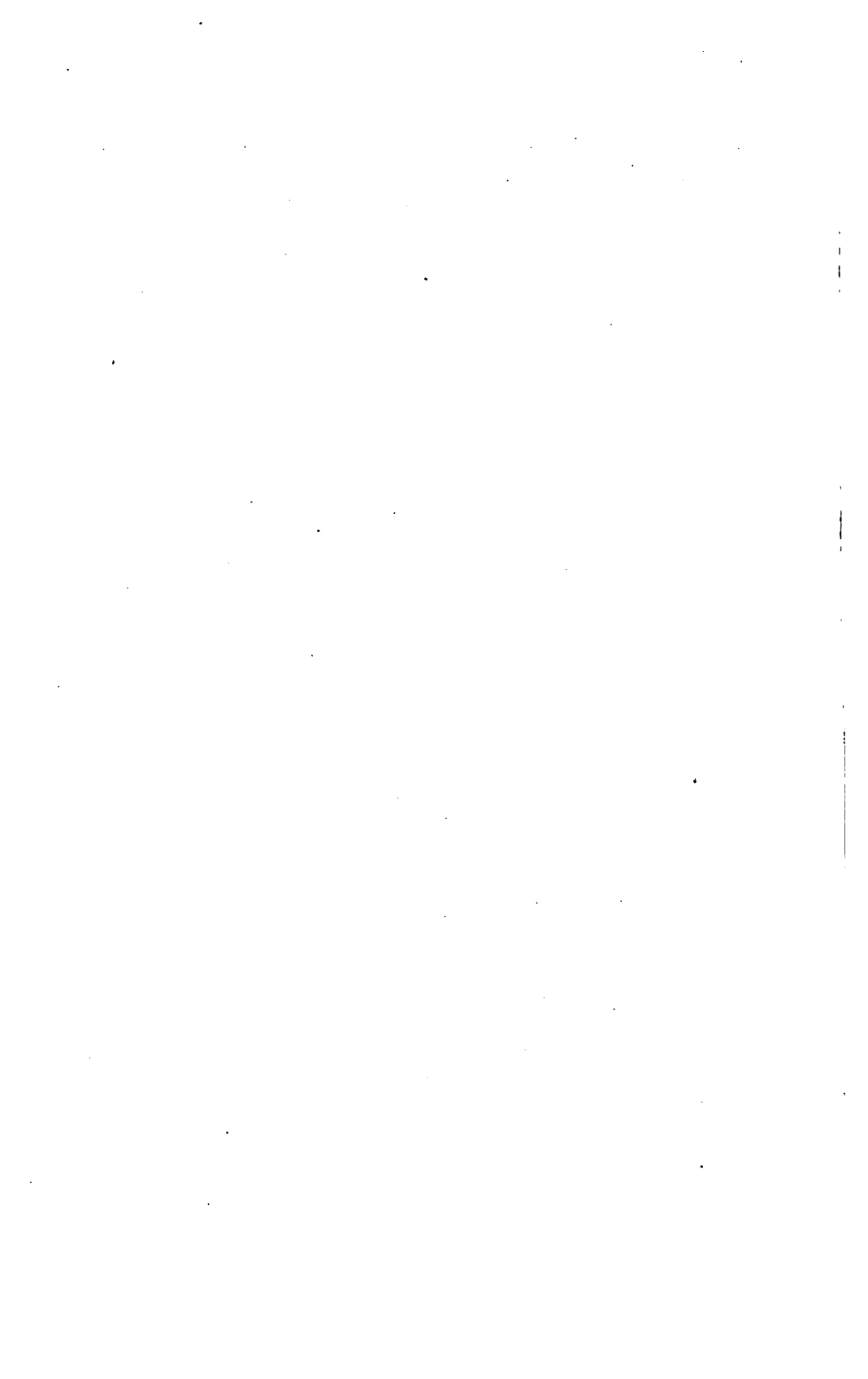
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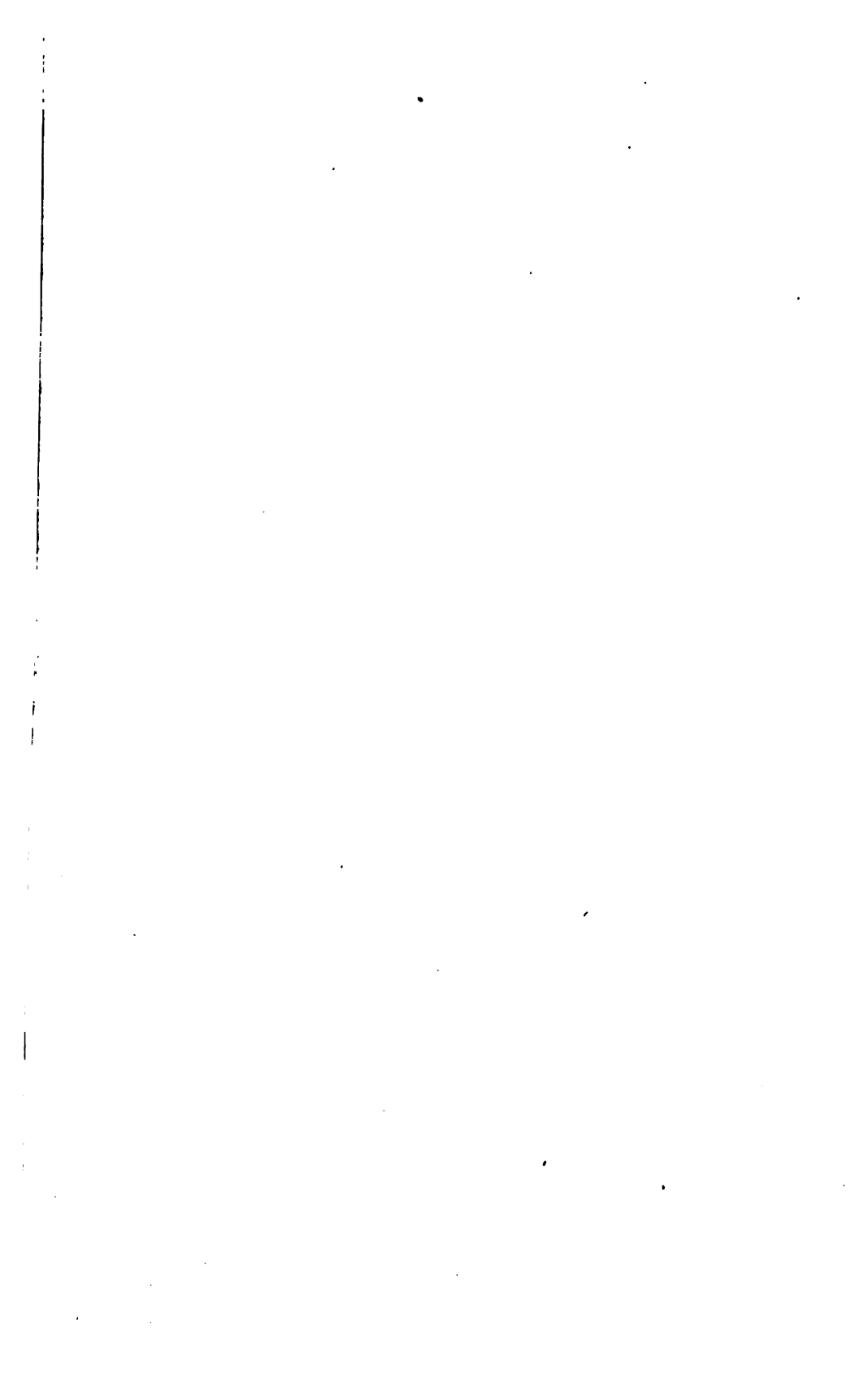


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56TH CONGRESS, }
1st Session. }

SENATE.

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HEARINGS

BEFORE THE

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COMMITTEE ON INTERSTATE AND FOREIGN COMMERCE

OF THE

U.S. HOUSE OF REPRESENTATIVES

ON

NEW PANAMA CANAL COMPANY, THE MARITIME COMPANY,
AND THE NICARAGUA CANAL COMPANY,
(GRACE-EYRE-CRAIGAN SYNDICATE.)

HELD JANUARY 17, 18, 19, 20, AND 25, 1899.

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NEW PANAMA CANAL

NEW PANAMA CANAL COMPANY.

JANUARY 17, 1899.

The committee met at 10.30 o'clock a. m., Hon. William P. Hepburn in the chair.

The CHAIRMAN. The committee has determined to hear to-day representatives of the New Panama Canal Company. If there are gentlemen here who desire to be heard, the committee is ready to hear them. I would like to ask, gentlemen, whether in what you say you desire to appear as advocates giving your statements, or as witnesses? I think I might say on behalf of the committee that they would prefer to hear witnesses, observing the distinction between those statements made under oath and those that are not so made.

We have had a great deal of loose statement before this committee on the general subject of the Isthmian Canal. I think it is the wish of the committee to hear everybody as far as may be. Of course we do not want anybody who appears as an advocate necessarily to take an oath; but we would like, as far as possible, that the statements made before the committee should be made as coming from witnesses.

STATEMENT OF WILLIAM NELSON CROMWELL, ESQ., GENERAL COUNSEL OF THE NEW PANAMA CANAL COMPANY.

Mr. CROMWELL. Mr. Chairman and gentlemen, I think that the suggestion of the chairman is a very proper one, and I will be very happy to conform to it.

In the absence of the executive officers of the New Panama Canal Company it falls to my lot, as general counsel, to make a very brief statement. I do not wish to appropriate a moment of the time that you wish to give to the consideration of the more technical branches of this subject, and I will therefore be brief.

The CHAIRMAN. We have an hour and twenty minutes. You can divide that time as you may see fit.

Mr. CROMWELL. The gentlemen who will appear after me will appear as witnesses, and I will be glad to avail of the responsibility which the chairman suggests.

Mr. Chairman and gentlemen of the committee, as two-fifths of the entire length of the Panama Canal is essentially constructed and in a measure open to navigation; as nearly one half of the entire work of excavation is actually completed; as the harbors at the termini are natural, open, and free to entry by vessels of the largest draft; as there is an existing railroad parallel to the canal and vastly expediting the work of construction; as the concessions, titles, and solvency of the company are unquestionable; as over 3,000 men, with a force

of over 150 engineers, have been for four years and are now actually engaged on the canal work; as the United States has by treaty with Colombia entered into special guaranties respecting a canal across the Isthmus of Panama; and as all this work has been done and will be completed without the cost of a penny to the people of the United States, we have a right to assume that the Panama Canal is a necessary if not the controlling factor in the solution of the isthmian canal problem.

Recognizing that it is our duty to place before you a full exhibit of the corporate organization, the legal titles and concessions, the physical status, and the final and definite engineering plans of the company, I shall proceed rapidly to do so.

In 1846-1848 a treaty was entered into between the United States of America and the Republic of New Granada (now Colombia), the thirty-fifth article of which especially relates to this subject. I direct your attention to this because you may not have had opportunity, with all your work, to examine it particularly. This is the existing treaty, and has stood for fifty years without the change of a letter. By it New Granada guaranteed to the United States entire freedom of passage, free of transit, and on entire equality with citizens of New Granada (Colombia) as to immunity from tolls, etc.

The treaty in full is as follows (reading from treaty):

The Government of New Granada guarantees to the Government of the United States that the right of way or transit across the Isthmus of Panama, upon any modes of communication that now exist or that may hereafter be constructed, shall be open and free to the Government and citizens of the United States, and for the transportation of any articles of produce, manufactures, or merchandise, of lawful commerce, belonging to the citizens of the United States; that no other tolls or charges shall be levied or collected upon the citizens of the United States or their said merchandise, thus passing over any road or canal that may be made by the Government of New Granada or by the authority of the same, than is under like circumstances levied upon and collected from the Granadian citizens, etc.

That is what New Granada guaranteed to the United States—free transit; equality. The United States—what did it upon its part guarantee? (Reading from treaty:)

And in order to secure to themselves the tranquil and constant endurement of these advantages, and as a special compensation for the said advantages, and for the favors they have acquired by the fourth, fifth, and sixth articles of this treaty, the United States guarantee positively and efficaciously to New Granada, by the present stipulation, the perfect neutrality of the before-mentioned isthmus, with the view that the free transit from the one to the other sea may not be interrupted or embarrassed in any future time while this treaty exists; and, in consequence, the United States also guarantee, in the same manner, the rights of sovereignty and property which New Granada has and possesses over the said territory.

And then, finally, the treaty provides in the sixth section—

Any special or remarkable advantages that one or the other powers may enjoy from the foregoing stipulation are and ought to be always understood in virtue and as in compensation of the obligations they have just contracted, and which have been specified in the first of this article.

Mr. STEWART. Does that treaty give the right for the transit of war ships, or simply merchandise?

Mr. CROMWELL. All ships, absolutely free transit. This was the first treaty ever made by the United States with any nation on the subject of an isthmian canal. It antedates the Clayton-Bulwer Treaty by four years and is superior to that treaty on the subject of an isthmian canal. The Clayton-Bulwer Treaty is subject to this prior treaty of the United States.

That was the encouragement the United States gave to Colombia.

Those were the guarantees it made. What did Colombia do? Colombia, on May 18, 1878, granted a concession for the construction of a canal, just as provided by that treaty. That concession is the one owned by my client, for whom I am now speaking; but in granting that concession Colombia most carefully and scrupulously protected the rights of the United States. The provisions relating to this are contained in articles 5 and 6 of the concession of the New Panama Canal Company.

Said articles 5 and 6 are as follows:

ART. 5. The Government of the Republic hereby declares the ports at each end of the canal, and the waters of the latter from sea to sea, to be neutral for all time; and, consequently, in case of war among other nations, the transit through the canal shall not be interrupted by such event, and the merchant vessels and individuals of all nations of the world may enter said ports and travel on the canal without being molested or detained.

In general, any vessel may pass freely, without any discrimination, exclusion, or preference of nationalities or persons, on payment of the dues and the observance of the rules established by the company for the use of the canal and its dependencies.

Exception is to be made of foreign troops, which shall not have the right to pass without permission from Congress, and of the vessels of nations which, being at war with the United States of Colombia, may not have obtained the right to pass through the canal at all times by public treaties wherein is guaranteed the sovereignty of Colombia over the Isthmus of Panama and over the territory whereon the canal is to be cut, besides the immunity and neutrality of the said canal, its ports, bays, and dependencies, and the adjacent seas.

ART. 6. The United States of Colombia reserves to themselves the right to pass their vessels, troops, and munitions of war at all times and without paying any dues whatever.

The passage of the canal is strictly closed to war vessels of nations at war with another or other nations and which may not have acquired, by public treaty with the Colombian Government, the right to pass by the canal at all times.

The United States is the only nation with which Colombia has ever made a treaty wherein is guaranteed to Colombia the neutrality of the Isthmus of Panama and the sovereignty of Colombia over said territory as above provided.

Mr. STEWART. Then it is not a neutral canal?

Mr. CROMWELL. It is neutral to the world.

Mr. STEWART. If concessions are made to the United States and not given to others it can not be entirely neutral.

Mr. CROMWELL. It is just in the position stated in the treaty, Mr. Stewart. And I say, further, that the United States is the only nation having the "special" or "remarkable" advantages provided for by the treaty. On several occasions—I have no doubt you will call them to mind—the United States has intervened to protect the property of the Panama Railroad Company, which is a corporation chartered by the State of New York, and has been in operation for about fifty years—forty-three years, to be exact. Like protection of the canal is by this treaty guaranteed to Colombia by the United States.

We have seen, then, the treaty of 1846, the special provisions of it, and the concessions to the canal company, wherein Colombia phrased its obligations (its contract with us), precisely in harmony with—exactly fitting into—the obligations it had assumed with respect to the United States. I shall not go into the history of the old company. We all know from the public records of the United States that hundreds and even thousands of railroads and other corporations have failed within the past few years, and we also know that the history of the important ones has been that of intelligent reorganization. The old Panama Canal Company having failed in 1889, it was placed in the hands of a liquidator—we call them receivers—by the courts of France on February 4, 1889.

While the receiver had no power to continue construction work, he took especial care to preserve and maintain the work already done, and also secured from Colombia extensions of time to complete the canal, and thereon made large payments to that Government.

On October 20, 1894—four years ago—the new Panama Canal Company was organized under the general corporation laws of France.

It is, gentlemen, a purely commercial corporation, and has no connection with or relation to any government, except such relations to the United States and Colombia as are established under the treaty and concessions, to which I have already referred.

Mr. STEWART. Why was it not incorporated, then, in the United States?

Mr. CROMWELL. Because the stockholders were in France; because the capital was furnished there.

Mr. STEWART. In France?

Mr. CROMWELL. Yes, sir.

Mr. STEWART. And France holds the key to the situation?

Mr. CROMWELL. Not France; gentlemen who happen to be citizens of France own the stock of the corporation. That is true. The board of directors is composed entirely of new and independent gentlemen, each distinguished in his field of activity and identified with large financial and commercial enterprises in France. I will furnish you a list of the board of directors, and if you will inquire among your acquaintances who know them they will tell you that each one of these directors is a distinguished man—distinguished for wealth, character, and probity. No one of them ever had any official relation to the old company, and no one of them is identified with or responsible for the failure of the old company.

I officially and unqualifiedly deny the statement, persistently circulated, that the new Panama Canal Company is under the control or influence, to any degree, of the Government of France, or that it is in any manner associated with or under the influence of any transcontinental railroad or any official thereof.

By decree of court all the canal, canal works, plant, machinery, concessions, and other property of the old company were sold, conveyed, and delivered to the new company in October, 1894.

The new Panama Canal Company is now the sole and absolute owner of all said property, and the title thereto is in its own name solely. Its title is unquestioned and has been officially recognized by Colombia.

The security holders of the old company have no vote, title, or ownership in the property of the new company or in the administration of its affairs. By private contract, merely, the new company has agreed that after all expenses of maintenance, operation, exploitation, dividends, reserve fund, etc., are provided for a specified share of the surplus shall be paid to the liquidator of the old company for the benefit of his constituents; but this agreement has no effect upon or relation to the absolute ownership and administration of the canal by the new company.

The concession to the old company was granted by Colombia May 18, 1878, and the time for completion was extended (December 24, 1890, and August, 1893) to October, 1904. Of course, when we speak of concessions we are touching a subject which lies at the very foundation of this enterprise, as it must be of any other canal. Has this enterprise any bottom, or has the bottom fallen out? becomes the question. Let us see. As I have said, the concession to the old company was granted May 18, 1878, and the time for completion was extended to October, 1904. In December, 1898, the Government of Colombia granted an

additional extension of six years from 1904, subject only to the formality of ratification by Congress—an assured act; thus giving the company twelve years from this time.

The concessions, gentlemen, are unquestioned. No complication of any kind exists with Colombia, whose cooperation is most cordial.

Colombia has most scrupulously respected and observed its treaty (of 1846) with the United States, under which the United States has guaranteed to it its sovereignty of the Isthmus of Panama and the neutrality of the canal, and in consideration of which the United States acquired the "special rights and advantages" therein set forth.

Perhaps I need not tell you that commerce has employed the Panama route for over fifty years. The conditions of traffic are established and well known. Its terminal cities—Colon, Panama—are ancient and firmly established. Upon the intermediate line thirty railroad stations, serving the neighboring villages and settlements, give character to the route. It is not a marshy jungle. It is a settled country, and the line has been made readily accessible and habitable by fifty years of traffic, development, and settlement.

Regular lines of steamers from Germany, France, England, Belgium, Spain, and Italy, on the Atlantic side, and San Francisco and all Central and South American and Mexican ports on the Pacific side, have for nearly fifty years regularly employed this route. The Panama route therefore needs no introduction to the commerce of the world, which has continuously employed it for nearly half a century.

As stated, the new company is now the absolute owner of the canal, canal works, buildings, machinery, materials, concessions, and all other canal property on the Isthmus.

The official accounts and reports of experts, on the files of the court in France in the receivership proceedings, show that the expenditures actually made by the old company on the Isthmus amounted to \$156,400,000, and that of this sum the cost of excavation and embankments proper amounted to \$88,600,000.

My company, for the purpose of having an absolute basis of value, caused a special commission to be constituted, presided over by the former director of the National Academy of Roads and Bridges of France, an eminent office, by which they established the absolute present and reproductive values, independent of the waste. That has been valued at \$90,000,000. In addition, the new company has made large expenditures for construction, machinery, etc., of some million dollars more. The present assets of the new company exceed \$100,000,000.

Mr. STEWART. What are the items of assets?

Mr. CROMWELL. I have not them here, sir; I can state them generally. The fixed property, you mean, upon the Isthmus?

Mr. STEWART. The new company; yes, sir.

Mr. CROMWELL. The items are as follows, roughly: Upon the Isthmus or canal work—one of the gentlemen here will give you a list of the machinery, which I have been told cost about \$30,000,000. That is the machinery alone.

Mr. CURTIS (of counsel for the New Panama Canal Company). It cost \$30,000,000.

Mr. CROMWELL. Mr. Choron will give you a general description of the property. It consists of dredges and—

Mr. STEWART. Perhaps it would be well to have other witnesses, who are fully informed as to that, give those facts later.

Mr. CROMWELL. Yes, sir; the question will be answered, then, in its order. The present value of the plant itself, the canal proper, which

PANAMA AND NICARAGUA CANALS.

* may interject right here, includes machinery which cost \$30,000,000 (you can have no conception of the value of the plant, but you will have when you have heard all the witnesses); and in addition the cash stock and personal assets of the company are some millions more, and ample for its needs.

I beg to remind the committee that we are not appealing for any money, and, of course, we are rather independent in regard to our financial statements. The company has no mortgage or bonded indebtedness of any kind. Its property is free from all incumbrance; it has no floating debts or other indebtedness than monthly pay rolls promptly met. The company, being financially independent and continuing the construction with its present resources, has neither created a bond issue nor solicited funds from the public nor from any government.

The board of directors, treating their relations to the enterprises as a solemn obligation and trust, resolved, first, to determine the feasibility of the canal from an engineering and financial standpoint, and, second, to carry on the work to final consummation under established conditions with the utmost dispatch, efficiency, and economy. During the past four years this board has addressed itself to the problem of ascertaining the scientific and commercial feasibility of the project with a care, comprehensiveness, and thoroughness that must command your respect and merit your confidence.

Although the skill of its own board of engineers is worthy of the highest confidence, the new company, out of abundant caution, and in order to place beyond doubt the final conclusions, caused to be appointed an international technical commission, composed of engineers selected from different nationalities, a course which assures to the company the benefit of the widest experience, the severest judgment, and most independent conclusions.

The commission is composed of eminent engineers of the United States, France, England, Germany, Russia, and Colombia, all of whom have been connected with works of magnitude, and each of whom is distinguished for the highest character and experience. As to all traffic, statistical, and economic questions the new company also established a special commission, presided over by M. Paul Leroy-Beaulieu, the eminent economist and a member of the Institute of France.

This commission was organized in February, 1896, and besides individual examination, study, and correspondence, committee work on special subjects, personal inspection on the Isthmus through a committee of their number, full discussion and frequent exchange of views, study of all preceding plans, and the daily development work on the Isthmus, has held over one hundred recorded sessions.

The committee reached its final and unanimous conclusion on November 16, 1898, which is embodied in its elaborate report, which has been adopted by the company and under which the work is proceeding. These conclusions, signed by every member of the commission, establish the entire feasibility, practicability, and cost of completing the canal. They are based upon years of continuous study and the testing of every element in the problem. Different plans, equally practicable but varying in probable cost, have been studied. Many months have been devoted to the consideration of each of them.

This work has not been done hastily or superficially. These engineers, chosen especially for their eminence in special departments of engineering work, have studied the questions in all their details—technical, climatic, physical, geologic, and economic.

This report was, on December 2, 1898, delivered by the new company to the President of the United States for the use of the Government.

Concerning their solution of the project and its details, we challenge inspection and criticism, with full confidence that the committee will agree with us that never before has there been presented to the Congress of the United States or any of its committees such an absolute demonstration of the isthmian problem.

While the reputation of the international technical commission needs no emphasis, it will assist you in appreciating the extent, character, and value of the results obtained if you are informed that, under the most economical administration, the company, in order to reach an absolutely authoritative conclusion, has employed for the past four years a staff of engineers consisting of from 160 to 175 men, and has in addition continuously employed from 3,000 to 4,000 men in construction and exploration work, at an expenditure of not less than \$4,200,000.

In behalf of the New Panama Canal Company, I beg leave to say that it is not seeking, and does not request, any financial aid from the Government of the United States in the completion of the canal. But I am authorized by the company to state that, in addition to the facts presented on this hearing, it places its canal works on the Isthmus subject to the personal examination of this committee, or any special commission through whom it may be desired to make such examination, and that it will be a pleasure to facilitate in every possible way, with all its resources, any such desire of the committee or the Government.

Mr. BARHAM. What is your official position?

Mr. CROMWELL. My firm are general counsel of the company—

STATEMENT OF GEN. HENRY L. ABBOT, U. S. A. (RETIRED).

Gen. HENRY L. ABBOT, being sworn by the chairman of the committee, gave the following testimony:

General ABBOT. Perhaps it is proper for me, being an American, to explain my position to the committee. I graduated at West Point and served forty-one years in the Corps of Engineers, United States Army, passing through all the grades up to colonel, inclusive, and being retired for age in 1895.

During the last seven years of my service I was president of the permanent Board of Engineers in New York, to which are referred the more important questions which come under the attention of the Chief of Engineers. I was also division engineer for the general supervision of all the engineer constructions in the northeast division, which includes all of New England, New York, New Jersey, Delaware, the Delaware River at and below Philadelphia, and Lake Erie as far west as Toledo. Since then I have been in the active prosecution of the profession of civil engineering. Without any application on my part I have prepared the plans for the new harbor at Manitowoc. I served as the president of the board of consulting engineers, which was established under the Chamber of Commerce of Pittsburg, in reference to the new ship canal projected from Pittsburg to Lake Erie.

I received an invitation from the new Panama company to join their technical commission, and I will be frank to say that at first I hesitated about accepting it, because I had the general American prejudice that the canal was dead, and I did not care to associate myself with something that was not likely to be successful. But I was assured by Mr. Hutin, the director-general of the new company, that if any person in the world wanted to know the fact if the completion of the canal was impracticable it was the company itself, because the question with them was one of investing their money, and if I was right in supposing the canal impracticable they wanted to know it.

With that understanding I went to Paris in May, 1897—nearly two years ago—and last spring I spent three weeks on the Isthmus, going through the route thoroughly, including the Haut Chagres, on horse-back and in boats, and looking at everything that is to be done. I have been serving on the technical commission at Paris the rest of the time. One word with reference to that technical commission. It is composed of gentlemen, six of whom are French. Three of them belong to the corps des ponts et chaussées, which has charge of all the civil works in France, as our Corps of Engineers for the internal improvements of this country. They are graduates of the military polytechnic school of France, who are allowed, if they graduate high enough, to be assigned to this corps. They hold in it the highest rank—that of inspector-general—and were selected for their wide experience and knowledge of the subject. Another member belongs to the corps des mines, whose line of duty made his judgment desirable in geological questions like that of Culebra.

Another member is a civil engineer now constructing large works of river improvement at Antwerp and thoroughly proficient in the character of construction required on the canal. The sixth member is the chief engineer of the Trans-Atlantic Steamship Company, the largest steamship line in France. They run steamers here, and to South America, and to the Mediterranean. So much for the French members. The two German members are the chief engineer and a member of the imperial commission during the construction of the Kiel Canal. Nothing more need be said than that.

The English member is Mr. Hunter, who is the chief engineer of the Manchester Canal and an authority on the subject of such constructions.

The Russian member has been head of the mining department of the Russian Government, and is an expert in technical questions connected with such work as is going on at the Culebra.

Mr. Fteley is the other American member. I need not say anything with reference to him to the committee. He has been the president of the Society of Civil Engineers of the United States, and is now building the largest masonry dam in the world. He is now the chief engineer of the aqueduct commission for supplying New York with water.

I will speak first of what I found when I went to Paris. The committee technique is not controlled by the company. It is organized to give technical advice. It has weekly meetings of a formal character, in which the proceedings are taken down, and typewritten copies are given to every member. A new member has thus the opportunity of knowing everything that has gone before.

All the members who are in Paris attend those weekly meetings, and general sessions take place at longer intervals. Informal sessions are frequent for consultation, and every member is thoroughly conversant with what is going on. Every point connected with the canal has been discussed and rediscussed, and I can safely say that I have never served on a board of engineers where more thorough attention is given to its duties than is given by this comité technique, as it is called in French.

Active operations have been carried on by the new company for four years. I have seen the engineers on the Isthmus and know the staff in Paris. They are competent and earnest men, and no charges like those brought against the old company could for a moment be raised with reference to these gentlemen.

A definite and final conclusion has been reached as to the project for

the canal. The recent work of excavation done on the Isthmus has been directed to fulfill two objects. One has been to remove many cubic meters out of the most difficult cut, doing that much toward the completion of the canal. The other has been to do it in such a way as to throw light upon the future operations, including side slopes, unit cost, etc.; that is, instead of working on the whole width of the canal, as the old company was doing, the new company have sunk a deep cunette, only 30 feet wide at the bottom, to explore in that direction and secure information as to what will be encountered hereafter. I will come to details later. About 4,000,000 cubic yards have been actually taken out in the past four years in this half-experimental and half-construction work.

I may now say a word in general terms about the project before going into details. The great ship canals of the world are limited in number. The Manchester Canal is the only one in which interior locks are required. The Kiel Canal requires locks at its entrances simply to regulate the tide, of which there is a large one on the North Sea and a small one on the Baltic. I have been through both and studied them both. Comparing the existing canals—the Suez, the Manchester, the Kiel canals, and the other great canals of the world—the adopted project for Panama is second to none. In some respects it is the best. The locks are larger than in any other. They could pass the *Oceanic*, the largest ship in the world.

There is no question but that for many years there will be ample accommodations. The curves of the canal, which are a matter of great importance with a large vessel, are all that could be desired. Before going through the Manchester Canal I waited a week in order that I might see exactly how a large ship would pass through. We had to have a tug ahead of us and a tug in the rear. The ship moved by her own motive power, but it was necessary to pull her head this way and that way to steer her around the curves, and an agent of the company, the pilot, told me when a strong wind blew from the stern or one side it was enough to make a man's hair grow gray to carry one of the largest ships through some of the curves. The least curve on the Panama Canal is four times that of the Manchester Canal and double that of the Kiel Canal, making a very much better canal.

Mr. MANN. How rapidly does the ship move through the canal?

General ABBOT. In traversing the whole canal, including the curved portion, she made 6.2 miles (omitting lockages). Her maximum speed was about 8 miles. The authorized speed in passing through large ship canals is usually limited to about that.

The width of the Panama Canal, taking account of the curves, is second to none. The safety of transit will be absolute, for there are no strong river currents and more than half of the canal is straight, while 42 per cent of its length has curves of 8,200 feet radius or more. So one may say that there is no great ship canal with locks existing in the world, and I believe none will be projected, which will afford equal facilities to navigation. Nature has greatly favored the route in this respect.

There are two great engineering problems connected with this canal. The first one is the regulation of the river Chagres. That river comes down from the mountains shown here on the map [indicating on map], and strikes the line of the canal at Gamboa. It then flows through a hilly country, but here at Bohio it leaves the line of the hills to traverse a low district to the Atlantic. Indeed, the river at its low stage reaches the level of the sea at this point—Bohio. The Chagres is a torrential

stream. It was a matter of great importance to note what the floods were, what volume they carried, and what means were necessary to control them. On my arrival at Paris I was surprised at the extent of information which the company had collected in that matter. I had served for four years with General Humphreys on the Mississippi River, and was somewhat familiar with such investigations, and I must say that the work was admirable.

We have here at Gamboa a continuous record of the height of the water, printed automatically on a tide gauge or, rather, fluviograph, that record extending from 1880 to the present time. So the new company has had its finger on the pulse of the river for nineteen years. There were discharge measurements made at the same place for a period of seven years, averaging about nine days during the month, and, if any special floods came down, a larger number. For six years similar measurements were made at Bohio, and for two years at Alhajuela. In order to be sure of a correct relative determination, daily measurements were taken at these three stations for thirteen consecutive months. I have studied the original reports received, giving the velocities and the areas and all the details, and I may say now that we know the Chagres River as well as any river in the United States.

Mr. STEWART. How do you pass the volcanic rocks above the Chagres?

General ABBOT. The cut?

Mr. STEWART. Yes.

General ABBOT. I am coming to that. I only wanted to say that the great study given to this subject of the regulation of the Chagres River enables us to speak with certainty as to its control. In reference to the next point I perhaps might give a general idea as to the route. Starting from Colon, on the extreme left, to this point (Bohio) a sea level is carried; that is, no locks are required.

Mr. HINRICHSSEN. What distance?

General ABBOT. Fourteen and a half or 15 miles. Almost all that excavation was done by the old company. I passed in a little steamboat all the way from a point near Colon to the vicinity of Vamos Vamos here [indicating on map], and all that remains to be done is to complete some little dredging. The work has been there now for some eight or nine years, and some little deposits have occurred, but you may say that the canal is essentially completed to this point, with a small allowance for increased depth to be made hereafter. Here at Bohio [indicating on map] a dam will be made which will make a lake extending to this point, where the Chagres first encounters the canal.

Mr. MANN. Is that green on the map supposed to represent the extent of the lake?

General ABBOT. Yes, sir; the green tint shows the surface of the lake as projected. That green line has been found by levels run through this district obstructed by tropical vegetation. That was a very laborious and difficult operation, but it has been done, and the levels have been checked, so that we know accurately the area covered by water when the lake reaches its projected level, 20 meters. This will be the border of the lake [indicating on map]. The same kind of surveys have been made for the upper lake. Those details are carefully determined.

Mr. HINRICHSSEN. How high is that dam?

General ABBOT. I am coming to that. I want to give a general idea of the canal route in the first place. When you reach this point, Bas Obispo [indicating on map], you encounter the summit level, where for

7 miles occur the heaviest excavations [indicating on map]. That distance, or rather about 5 miles of it, includes all the difficult excavation of the canal. When Paraiso, at the further extremity, is reached, it is a simple engineering problem to gain the Pacific Ocean. The troublesome excavations are all contained in that little stretch of 5 miles.

The whole length of the canal is 46 miles. In the original plan the old company proposed to carry the sea level throughout the entire distance. In the Culebra, especially, which is here at this point, they encountered great difficulty from sliding and caving. The excavation, which passed through a clay soil, yielded under the heavy rains and side pressure, and they had a great deal of trouble. This matter was the second great object of study by the new company. It is now found—I have spent two days in the place myself, so I speak from personal knowledge as well as knowledge of the records—that this troublesome strata has been passed through and the digging is now in a kind of argillaceous schist which requires blasting before it can be taken out. It stands well on steep slopes, and in some places that have been dug out for a couple of years it is still almost vertical.

The working is now in a soft rock where blasting is necessary and where we are sure that there will be no more sliding or slipping. This longitudinal profile illustrates the canal project. The brown tint represents the original surface and the work of the old company. The yellow tint represents the work that has been done by the new company. The red tint shows the work which has still to be done and which has been investigated by pits and borings, so as to be sure that the real character is known. This black line shows the bottom of the projected canal level which is under consideration.

Mr. HINRICHSSEN. The level of what?

General ABBOT. There are three canal levels which are possible. The one we recommend is 30 feet below this level [indicating on the map].

Mr. HINRICHSSEN. The level of what?

General ABBOT. Of the bottom of the canal. This plan here—this line here—shows the level of the project as now favored and recommended. I am coming to that subject by and by; but I want to show first the character of the work done, and so merely refer to that now. Pits have been made in great numbers, as you see, and carried below the level of the proposed excavation, and therefore we know what we are coming to. There is no further difficulty from caving to be apprehended in the Culebra. The investigations also included a tunnel along here [indicating] at a level of 41 meters above the sea. The locality used to be called the Cucuracha, and was the worst place on the whole line in the old days. The tunnel is about 1,000 feet long and 10 feet in diameter. I went through it from beginning to end, carefully looking. Where it enters here there was some of that sliding clay, and an iron sheathing was necessary; but as they advanced they soon struck better material. After having passed that short distance [indicating on map], instead of having to use full sheathing, partial supports only were required, and at the end none at all. The digging there was in rock, which stood well without any sheathing.

That illustrates the true character of the material at the Culebra. The idea of a sliding mountain was based on the supposition that the same sort of yielding strata which was found when they first began was going to extend to the bottom. It was not so. Fortunately for the canal, the material has changed its character entirely. As I have said, the excavations of the new company have been concentrated at

that place [indicating on map]. A great many surveys and investigations have been made elsewhere, but the actual digging has been there, and the plan has been to dig rather vertically than horizontally, so as to reveal as much as possible to the eye. They have taken out about 4,000,000 cubic yards (3,000,000 cubic meters) in the past four years.

They had several other objects in view in so doing. They wanted to know how much it was going to cost per cubic yard and what side slopes were necessary. The mode adopted was a skillful adjustment of the work to reveal how future digging should be made.

I will now give a brief outline of what I saw myself in inspecting the route.

We went by steamboat from Colon down here to near the vicinity of Bohio [indicating on map]. From there we passed by the Panama Railroad. The railroad runs parallel and near to the canal all the way, and is of immense assistance in communication and work. We followed along there [indicating on map], stopping at all the points necessary for our purposes to look at the excavations, lock sites, buildings, stored property, or any other interesting matters, until we reached Panama [indicating on map]. We then inspected the new docks at La Boca, and examined the record of old and new soundings in the dredged channel in the bay, which show that there has been no serious filling by moving sand during several years of nonuse.

On this upper portion [indicating on map] of the Chagres River, where there are no roads, we went up in boats, stopping at various places, to the dam site near Alahajuela, and then took horses, riding through this district where the feeder will pass and then returning to Gamboa. In other words, we examined everything that was to be seen, and we know exactly what the condition is down there.

Passing to the project for the canal itself. The question of time is one which has been considered by the committee technique as very important. The excavation at the Culebra is restricted to a very short space, and where work is so confined you can put only a small number of men and a small number of machines at work; and, moreover, to remove the excavated materials involves railroad transportation and crowding of tracks. This is unfortunate, for if the work could be spread over a larger territory the time could be reduced. The object has been to adjust the depth of the cut—and, of course, the deeper you go the longer it takes to get the material out—to adjust that level so as to consume the same time that will be required down here at Bohio for constructing the dam, the locks, and the deversoirs.

At last, after long investigation and consideration, we have come down to three possible projects. One, which requires eight locks and which has been definitely adopted, places the bottom of the canal at the level 68 feet above the sea. There are two different summit levels that are still possible. The upper one, formed by adding another lock at each end, places the bottom of the canal at 97 feet above the sea, and is the highest. If we find, however, that we can dig down faster than is estimated, we can go 35 feet more, omit two locks, and place the bottom of the canal at 33 feet above the sea. The adopted plan is based on the supposition that the maximum time required will be ten years.

It is possible, and we believe that with the new machinery and with the improvements that have taken place in operations of that character we shall be able to reduce that time, and the final level of the deepest cut will depend upon the speed which we find we can make. This intermediate level (68 feet) is the official plan. Passing

from the sea level at Bohio, there are 2 locks, each with a normal maximum lift of about 28 or 30 feet. We then pass through Lake Bohio for a distance of about 14 miles, and we come to Obispo, which is where we enter upon the difficult portion of the excavations. With 2 more locks we reach the summit level [indicating on map].

Mr. HINRICHSSEN. What is the height of the lift?

General ABBOT. Nine meters, or 29.5 feet.

Mr. HINRICHSSEN. For both, or one?

General ABBOT. For one. I am giving you now the limit that we fix. They will vary a little. These are a little less [indicating on map], but 9 meters has been adopted as the maximum lift we will allow. Some of them are less. There is the deepest cut through the mountain [indicating on map]. At Paraiso we drop down with 1 lock; at Pedro Miguel we drop down with 2 locks, and at Miraflores we have a single lock, which is a tidal lock. There is no tide to speak of on the Atlantic, but on the Pacific side there is a 20-foot tide. So at Miraflores it is necessary to have a tidal lock, as they do with all places in Europe where they are cursed with big tides, which fortunately we escape along the Atlantic side.

Mr. HINRICHSSEN. What is the length of this summit level?

General ABBOT. About 7 miles.

Mr. BENNETT. What is the deepest cut?

General ABBOT. The original cut at the divide, when the company first began, was above sea level 344 feet. The present level of the bottom of the cunette is about 176 feet, giving an excavation of about 168 feet. Nearly down to that level it is actually excavated. With our project, the official project, the intermediate project, the bottom of the canal will be 68 feet high, which will mean 108 feet more to be excavated to reach to 68 feet above the level of the sea. All these levels mean above the level of the sea.

Mr. MANN. How much of a cut will that make?

General ABBOT. About 276 feet, or something like that, from the original level, but not from the present level. The present level is not estimated from the whole canal cut, but from the bottom of the cunette; from that it is only 108 feet.

Mr. BENNETT. And that will extend about 7 miles?

General ABBOT. No; that is the deepest. The summit level here [indicating on map] is divided here, as you will see on the profile [indicating on map].

Mr. BENNETT. Just generally—

General ABBOT. The deepest cut is restricted to the Culebra, which is less than a mile long. What we call the Emperador, which is the portion extending between Culebra and the Obispo, is very much less than that.

Mr. MANN. What is the average cut in that 7 miles?

General ABBOT. You can see it from the profile. I can not give you the figures. You can tell better by that.

Mr. MANN. I could tell better if you would give me the figures.

General ABBOT. The black line, the one I am marking now with my finger, shows the original excavation. Here is the Emperador and here is the Culebra. The line which I follow now shows the one which was actually excavated, and the lower one [indicating on map] is the bottom of the cunette. We are to come down to this level here [indicating on map]. So you can form an idea better than I can tell you.

Mr. MANN. I can not tell by that.

General ABBOT. We can tell you the number of cubic yards taken out.

Mr. BENNETT. Can you give us the height of the point where you make the greatest excavation?

General ABBOT. The what?

Mr. BENNETT. How high the point is where you make the greatest excavation.

General ABBOT. I have given that.

Mr. HINRICHSSEN. When the canal is completed, what will be the deepest place in it, from the surface level to the bottom of the canal?

General ABBOT. That was the figure I just gave. It would be 344 feet less 68 feet, which is 276 feet. That is the very worst, at the highest point in the Culebra. The cut in other parts of the summit level drops down to almost nothing, and the average cut could easily be computed. It is a great deal less than that. In such cases, you know, we estimate by the cubic yards you will have to take out in order to get to your final level.

Mr. MANN. I don't see how you can at present.

General ABBOT. That figure can easily be computed?

Mr. CROMWELL. What proportion of the entire excavation has been done?

General ABBOT. Of the whole canal?

Mr. CROMWELL. Yes.

General ABBOT. The total excavation that is left is now 50,000,000 cubic meters. That is about (witness hesitating)——

Mr. CROMWELL. Won't you take up the question of dams?

General ABBOT. The total amount of excavation required to complete the canal—that includes the question you requested and all other work together—is 67,000,000 cubic yards.

That brings us down to the canal as we propose. The old company had completed altogether, with the works of the new company, about 50,000,000 cubic yards. So we have 50,000,000 cubic yards taken out and 67,000,000 still to do. That shows that the canal is almost half done, estimated by the number of cubic yards of excavation, which gives a positive measure, more definite than to give it in average depth of cut.

Now, in reference to these dams. The dam at Bohio, which is at the lower locks, is represented on this map at this point [indicating on a map]. The line of the canal is shown by this red line. At Bohio the line of hills which forms the projected lake crosses the river at a place where the dam is projected. Its total length is 1,285 feet. Its maximum height is 75 feet. The depth of water at the dam will vary between 52 feet and 65 feet, according to the level of the lake.

A great many borings have been made, and they show that both banks are rock. The bed of the stream is at first sand, changing to what the geologists say is a tertiary clay. It is not a deposit of the present period. It forms a good foundation.

Mr. HAWLEY. An impervious clay?

General ABBOT. Yes; an impervious clay that Mr. Fteley and all the experts say is a perfectly practicable foundation for an earthen dam. It is not suited to masonry, because we never build a masonry dam unless we can get rock. This shows the cross section [indicating]. This has all been determined by borings, and we know at what depth we shall reach this stratum of clay [indicating on map]. That shows a cross section of the dam. At the foot of the upper slope is a trench cut down to the clay bed and filled in with concrete, so as to make a perfectly secure protection against infiltration at the bottom [indicating]. The whole upper slope of the dam is covered with rock flagging laid in

cement, so as to make a tight water cover on that side [indicating]. The lower side is covered with rock flagging laid dry, so if any water should get in it could get out without making trouble. The actual width at the top is 15 meters, or 49 feet.

It is easy to build this dam, because the locks are projected here in a cut through the rocky hills; and the river can be deflected through this cut by a little provisional dam or dike here, without adding to the cost [indicating on map], while the dam is constructing. So, as a problem in dam construction, this case is entirely within the limits of ordinary engineering experience, and no serious obstacle or difficulty is presented.

Mr. HAWLEY. Except that it rests on clay.

Mr. HINRICHSSEN. What is the material?

General ABBOT. Clay and sand, of which a good quality for water-tight packing is found in the vicinity.

Mr. CURTIS (counsel for the Panama company). The water does not flow over the dam, does it?

General ABBOT. No; the top of the dam is 10 feet above the highest lake level. It flows here [indicating on map]. In case of a sudden flood during construction, and also afterwards to keep the lake at its proper level there are two spillways or déversoirs, one here [indicating] and one here [indicating]. The water that flows through these spillways is at such a level as to render unnecessary the extension of that rockwork on the lower side which is shown here on this profile. It is designed only to hold the dam during its early stages in case of a sudden flood.

These spillways or reservoirs are to be built on the same system that is used on the Manchester Canal—the Stoney system. The sill is excavated to the proper level. There are sliding counterpoised gates, about 10 feet high, which can be raised or lowered in these little divisions [indicating on map].

Mr. HINRICHSSEN. Like those in the spillways in the Chicago drainage canal?

General ABBOT. I imagine so. I do not know whether they are exactly the same idea. I have seen them myself on the Manchester Canal, and the chief engineer says they are entirely satisfactory. Ours will be something of that kind. By raising and lowering them the level of the lake can be readily controlled.

Mr. CURTIS. How many are there?

General ABBOT. Two. One here [indicating on map] and one here [indicating on map]; and the same principle is applied at the Alhajuela Dam on the upper river. This second site here was not known until within the last year or two. It was discovered in contouring that nature had prepared an escape for the surplus water, which would run down here [indicating on map] and not trouble the canal at all.

Mr. STEWART. Are those gates regulated by steam power?

General ABBOT. No; one man does it, aided by the counterpoise. It is perfectly simple. It has been verified completely on the Manchester Canal.

Mr. HAWLEY. During the earlier part of your remarks you said that three months had been spent in taking the velocity of the river.

General ABBOT. Three months?

Mr. HAWLEY. Didn't you say that you had occupied three months in taking the velocity? What time did you say had been occupied in doing that?

General ABBOT. About seven years. The work of discharge measurement went on regularly after 1890, when the old company came into the hands of the liquidator. We have had the automatic tide gauge register at Gamboa, where the river first strikes the canal, since 1880.

Mr. HAWLEY. You said you would explain how you regulated the velocity in times of torrent. You have not reached that yet. You spoke of regulating the volume of water in the Chagres River.

General ABBOT. I was coming to that, but I can take it up now if you desire.

Very little need be said with reference to the upper dam here [indicating on map], because nature has favored us greatly. There a hard rock bed and banks give us every facility for making any kind of dam we please. The dimensions in English measure are: Length of crest, 934 feet; maximum height above the lowest point of the foundations, 164 feet. The lake thus formed has an area of 6,175 acres.

There is nothing connected with that dam which makes it more difficult than many others that have been constructed and are well known to engineers. This section shows the locality well. Here is rock on both sides [indicating on map]. Here is the present sand in the bed of river, which has been bored through in many places so that the depth to the rock is accurately known, and it is simply a question of putting in the concrete masonry. All the details had been worked out previously, and when submitted to Mr. Fteley were said by him to be "too good." In other words, in his opinion they erred by excessive provision for safety rather than otherwise.

The CHAIRMAN. I am sorry to interrupt you, but the time for our adjournment has arrived. I suppose all of us would like to hear what these gentlemen have to say about this great work. As our time to-morrow will be fully occupied I would suggest that as many gentlemen as can return here, say at 2 o'clock, and we can continue in an informal way.

Mr. CURTIS (counsel for the Panama company). We are very much obliged to you for your suggestion. Perhaps the most important and most interesting feature of this work has yet to be explained. That is the feeder to convey water from the upper dam to the summit level.

Mr. CROMWELL. Any day in the week would suit us to continue this hearing—any day that would be convenient to the committee.

Thereupon, at 12 o'clock the committee took a recess until 2 o'clock p. m.

AFTER RECESS.

At the expiration of the recess the committee reassembled, Hon. William P. Hepburn in the chair.

The CHAIRMAN. Gentlemen, we will probably be able to give you two hours, which will take us up to 4 o'clock, and you can arrange the time among yourselves.

TESTIMONY OF GEN. HENRY L. ABBOT—Continued.

General ABBOT. I am prepared now to answer the question which was asked this morning with reference to the average depth of the cut through the Emperador and the Culebra.

I would say in advance that that standard of measurement is not one which would be ordinarily used by an engineer for the reason that a foot at the top means a great deal more excavation than it would at the bottom. It is a sliding scale. So we always measure in cubic yards. But

as a matter of fact of the cut between the Obispo and Paraiso—that is, the cut that covers the summit level, 7 miles in length—about 2 miles are already excavated. There remain, therefore, about 5 miles, including the Emperador and Culebra. For that distance, 5 miles, the present level is about 150 feet, on an average, above the sea. The level of the bottom of the canal as projected is 68 feet, leaving an average excavation for 5 miles of 82 feet. The number of cubic yards remaining to be excavated in this distance is about 31,000,000 cubic yards, of which about 14,500,000 are in the Culebra proper, about 1.1 miles in length.

I was speaking about the dam at Alhajuela, to create the upper reservoir. That dam, as I explained, is entirely of concrete masonry abutting on rock walls and resting on rock. It is at an ideal position for a dam.

I have now to explain how water will be transported from the lake thus formed to the canal to supply the summit level during the three dry months of the year. This will be done by a feeder which taps the lake and is carried along the side —

Mr. BARHAM. Parallel with the river?

General ABBOT. Essentially parallel; yes, sir. It follows along down on this line [indicating on map], and we have special drawings to show the details. There are three divisions of that feeder route which start at the lake, and, allowing for the head of water necessary to overcome the resistances to flow, carry the discharge into the canal about a mile nearer the Pacific than the locks at Obispo, so as to cause no confusion or trouble by cross currents.

Mr. BARHAM. You have three ditches, then?

General ABBOT. There are three divisions. I am going to describe it under three different heads, because there are three different districts to be crossed. But I would say in the beginning that the location has been made so as to supply either one of the three different summit levels already described. This line here [indicating on map] represents the route to be passed over by the water in flowing from the upper lake to the canal.

Mr. CURTIS (counsel for the Panama company). What is the distance?

General ABBOT. Between the two?

Mr. CURTIS. Between the lake and the summit level.

General ABBOT. The distance is 10 miles, and the slope given the feeder is computed by engineering rules.

Mr. BARHAM. What is the fall?

General ABBOT. About one in a thousand.

Mr. BARHAM. From the proposed lake up there down to the line of the canal, what is the fall in feet, about? [After a pause.] One hundred feet, or a thousand feet?

General ABBOT. The canal leaves the lake at 58 meters above sea level.

Mr. CURTIS. He asks you what is the fall in feet?

General ABBOT. I haven't it in feet; I have it in meters. We use the metric system, and translating it into feet of course involves a mathematical computation.

Mr. STEWART. I would suggest that it would be well to give these figures to us in feet, miles, and so on.

Mr. CURTIS. With the permission of the committee, we will furnish a table transposed to feet and miles, so it will be on the record.

Mr. CROMWELL. I would say that the engineers in charge of Government work use the metric system to a considerable extent in the United States.

General ABBOT. The total fall is about 88 feet from the lake to the summit level of the canal.

Mr. BARHAM. In the 10 miles?

General ABBOT. Yes, sir. In passing from the Lake Alahajuela to the canal we cross the Rio Chilibre, which is a large stream, that would require a drop below the level of the feeder. Therefore, we divide the route into three divisions: First, from the lake to the Rio Chilibre, then across the Rio Chilibre, and then to the canal proper. I will speak now of the first one. This distance is about $2\frac{1}{2}$ miles. It passes over a rocky ridge, which is cut somewhat by cross gullies; and to save the extra length in following around them we propose to make small masonry dikes to stop the flow, and create little ponds, which will form part of the feeder. In that way we save distance and save expense. From the dam to the Rio Chilibre we have only that kind of construction to make, with a few short tunnels under cross ridges.

Mr. STEWART. Is that trap rock?

General ABBOT. No, sir; it is rock.

Mr. STEWART. Is it trap rock?

General ABBOT. No, sir; it is a hard, solid material which is suitable for construction. The geology of the isthmus is very complicated. We find trap veins injected through argillaceous schist and other ancient volcanic products, and more rarely calcareous rock. There is no trouble in obtaining stone suitable for concrete.

As to this first division there is nothing especial to say, except that we make a tolerably straight route by using little tunnels and under cross ridge, and little dams, or more properly dikes, to check the flow and form the little lagoons in lateral ravines.

When we come to the Rio Chilibre we pass down to its level by the method of inverted siphons, and rise again to the general level that is necessary to carry the water to the canal itself. This use of pipes is more economical than to build the immense structure of a bridge to maintain this level. The detailed plans are all here [indicating on plan]. Starting from the Alahajuela dam at this point [indicating], we go through this rocky material with these little dikes until we come to the Rio Chilibre and its branch, the Juan Mina. The pipes are laid over the former, as shown here, and then we rise to the level of the canal again. A second inverted siphon crosses this branch of the Rio Chilibre, known as the Juan Mina. The details for these pipe lines have all been worked out. There are three separate pipes resting upon concrete and capable of carrying 25 cubic meters a second.

Mr. BARHAM. What would be the diameter of the pipe, about?

General ABBOT. Two meters and four tenths; that is, 7.9 feet. There are three of them side by side, with provision for putting in another one in case we wish to augment the discharge, making it possible to double the estimated volume very nearly, with the view of carrying a larger commerce in the future. The expense would be simply to put in another pipe to increase the capacity.

After we have passed this division we strike the third, consisting of the ordinary hills bordering the valley of the Chagres, which are traversed on nearly a straight course, as shown on this map, by means of the same system of small dykes for side ravines, forming little lagoons, and by little tunnels under cross ridges, all of which are of small dimensions. This carries us through to the point where we reach the canal itself. At the very end is a tunnel 430 meters long which carries the water into a natural valley that delivers it into the canal with moderate velocity. I am somewhat familiar with works that have been

made for irrigation purposes in our Western country, and after examining this route and recognizing that its construction will be expensive, I am sure that such a feeder, not quite 10 miles long, would be regarded in California as presenting no serious engineering problem.

With that completed, we have an ample supply for the highest possible summit level of the canal; and for the adopted project, of course, we gain the water power here [indicating on map] due to a fall of 30 feet, which will be useful in operating the canal.

To regulate the Chagres River there are two points to be considered. The first is, to check the floods enough, when they come down, to prevent any serious velocities here in the upper portion of the lake, which is narrow; and, in the second place, to prevent too much water passing Bohio to the lower level, where it might make trouble.

To form a trustworthy estimate of these flood volumes a series of observations, extending really over nineteen years, is available, as I have already stated.

We know since the canal work began that there have been five great floods, and that no flood occurred between 1850, when the railroad was begun, and that time which was comparable to one of those floods.

Of those five great floods the last one was measured accurately. That was the flood of 1893. We know definitely how much water passed in that flood. The flood of 1890 was partially measured, as were those of 1888 and 1885. The flood of 1879 was the largest within the memory of the inhabitants, and we have adopted that as our standard.

We have water marks which enable us to estimate from our gaugings what the discharge must have been at those levels. That volume forms the basis of our estimates for regulating the flood discharge. More water flows at Bohio than at Gamboa or at Alhajuela because the rains in the lower valley contribute to increase the volume as one goes down the stream. The total volume needful to restrain the flood of 1879 at Bohio was 250,000,000 cubic meters, which is—(witness hesitating)—8,800,000,000 cubic feet.

Mr. BARHAM. You multiply by thirty-five and a fraction.

General ABBOT. Of this we propose to reserve 150,000,000 cubic meters in Lake Bohio and 100,000,000 cubic meters in Lake Alhajuela [indicating two different points on the map]. If a flood, even as great as that of 1879, should occur, these lakes would enable us to check its violence by stopping a large part of it in the upper lake and then holding back enough of the remainder in the lower lake to prevent damage below. When the flood had ceased, by means of the spillways the reserved water would be let out gradually, to be ready to receive another flood. Those standard volumes are determined by calculations which have been made very carefully, and are based upon definite measurements, for years, of the actual discharge of the river. They, and the supply of the summit level in the dry seasons as well, are independent of any theories as to the volume of the rainfall which can be counted upon to flow off in the rivers; and I will say that in the other canals that I have knowledge of engineers have been compelled to depend in their estimates upon an assumed proportion of the rainfall that will flow into the river. We do not have to depend upon that. We know it by actual measurements, and therefore are secure.

Mr. BARHAM. What is the highest rainfall known there?

General ABBOT. The rainfall here, where the work is heaviest [indicating the summit level on map], has been measured thirty-two years at four different points, beginning at Gamboa, where the Chagres River

comes in, and extending to the Culebra. The mean annual precipitation in those years is 93 inches, which is only 50 per cent more than we get at New Orleans, in this country.

Mr. BARHAM. In 1879 what was it?

General ABBOT. They began their records later.

What I want to point out is that while most canals have to depend upon an assumed proportion between the water that falls and the water that flows off in the river the Panama Canal Company has actually measured the latter and know those figures definitely. So much for the regulation of the floods.

In order to supply the summit level with water, we must be sure that the Chagres River carries enough water throughout the whole year, or we must provide the deficiency. We have made a careful estimate, and we know we want 20 cubic meters a second to supply the lockages demanded by the expected traffic.

Mr. STEWART. You are giving testimony now. Those careful estimates, it seems to me, we ought to have.

General ABBOT. I was giving you the figures. Twenty cubic meters a second is the amount required.

Mr. STEWART. How do you arrive at that?

General ABBOT. By taking the number of vessels which would probably pass through the canal; by taking the volume of our locks, which we can compute, knowing the length and the width and the depth of the water. Whenever a vessel passes through a lock, we have to expend that amount. In that way it is a matter of mathematical computation to see how much water we must have available to supply what we are going to lose by the passage of these 24 ships.

Mr. BARHAM. Which will go out through the locks?

General ABBOT. Yes, sir. It is a matter of computation, and we know that 20 cubic meters per second will supply that.

Mr. BARHAM. That was the basis of the calculation?

General ABBOT. Yes, sir.

Mr. BARHAM. What do you do about percolation and evaporation?

General ABBOT. That does not come into this. This is the number of cubic meters we are going to require. Evaporation and percolation tend to reduce the volume in store. In Lake Bohio we allow a meter extra depth—that is, instead of drawing on the upper reservoir for these losses, we place the normal level of Lake Bohio at 17 meters above the sea, and excavate the channel to be deep enough at 16. That is simpler than to have to supply the losses by the feeder during the dry season.

Mr. BARHAM. You estimate something besides what will go out through the locks, then?

General ABBOT. Yes, sir; we include all that, but not in the 20 meters. We know by daily measurements carried on for thirteen months what the flow is during the dry season. The dry season on the isthmus lasts for four months—January, February, March, and April. During January the drainage from the previous rains—all the rest of the year it rains with comparatively a heavy downfall—is more than is needed to supply the 20 cubic meters for the canal. During the months of February, March, April, and May the river flow drops about 18 cubic meters per second, and we need about 2 more. By storing 2 cubic meters per second for ninety days, we know the natural flow of the Chagres River will supply the rest and give the volume required to enable the canal to be operated.

Mr. BARHAM. Then for three months the Chagres River does not

afford enough water to keep up the loss by evaporation and what goes out through the canal, etc.?

General ABBOT. For three months in the year we have to supply 2 out of the 20 cubic meters.

Mr. BARHAM. From the artificial lake?

General ABBOT. From the reserve in the lake.

Mr. MANN. And the river supplies the other 18?

General ABBOT. Yes, sir; the river supplies the other 18. That we know by actual measurements—daily measurements for thirteen months and very frequent measurements for six or seven years.

Mr. HAWLEY. Do we understand that the water which you will have will be sufficient to float ten vessels only? Is that the maximum number of vessels that can go through in twenty-four hours?

General ABBOT. The volume is estimated to pass ten 2,000-ton vessels in twenty-four hours.

Mr. HAWLEY. But not more?

General ABBOT. The capacity could be increased. We hope the commerce will demand it. A provision has been made for increasing the volume of water carried by the feeder. We propose to deliver 25 cubic meters instead of 20 to be sure to meet any demand, and we have also made provisions to increase the flow to 35 cubic meters in case the traffic should demand it. That will be carried by adding an additional pipe to those siphons.

Mr. STEWART. Are not some of those problems connected with the building of this canal entirely new and unknown to civil engineering experience?

General ABBOT. No, sir; there is nothing in the project which asks any engineer to go beyond the recognized rules of the profession and the regular service practice. There is nothing here which would be considered otherwise than ordinary engineering work.

Mr. BARHAM. Will you please explain to me—because I don't know anything about it—how you calculate to keep a certain amount of water in that upper lake?

General ABBOT. That we did by means of a spirit-level survey, assuming a height near what we knew the water level would have to be approximately. We ran spirit-level lines around this green line here [indicating on map], carrying them through a country covered with tropical vegetation and very rough, making it a very slow, expensive, and tedious job.

Mr. BARHAM. That gives the lake?

General ABBOT. That gives the area of the lake.

Mr. BARHAM. How did you calculate the evaporation that might take place there as seepage or percolation or losing water in that way?

General ABBOT. With reference to that question, the river above there flows in a rocky valley with probably very little percolation. It comes out of the mountains.

Mr. BARHAM. Do you know anything about the fissures or subterranean caverns, or anything of that kind?

General ABBOT. There is no evidence of anything of that kind. We are satisfied that there is nothing of that kind there. It is not within the power of a human being, you know, to discover a subterranean outlet, but we do not apprehend any. The amount of evaporation of the lake is included in the reserve capacity of the lake.

Mr. BARHAM. That could be calculated?

General ABBOT. Yes, sir; by the usual rules. In a climate like Panama it is only necessary to know what the conditions are going to

be for three months. We have all the rain that is wanted during the rest of the year. The isthmus is not like a country where there are liable to be long droughts.

There is another matter. Since we are going to build a dam at Alhajuela, it only needs to build it a little higher to hold more water, by which we secure an additional reserve, by means of which, through a turbine wheel and a dynamo, we shall generate enough electricity to light the whole canal. We have reserved enough water there for that. This mode of electrical transmission of power has been immensely developed of late, and is well known in this country. I would like to give you some details about recent experiments in Utah.

During the past two or three years the Union Light and Power Company of Salt Lake and Ogden have erected a power plant at Ogden for the purpose of generating electricity. At a test the company made last year they conducted a current of electricity of 25,000 volts from Ogden to Salt Lake City and return, a distance of 70 miles, with scarcely any appreciable loss. This company is now supplying the electric current for commercial uses to the citizens of Salt Lake, a distance of 35 miles.

Now we are going to have a power plant at Alhajuela and another at Bohio [indicating on map]. The fall will give us a supply sufficient to light all the canal.

Mr. MANN. Is that figured upon a basis that there will be no loss in transmission?

General ABBOT. No; we allow a large loss in our figuring; but these experiments came to my knowledge quite recently—

Mr. MANN. Do you believe that to be true—that that is conveyed 70 miles without any appreciable loss in transmission?

General ABBOT. I can only say this is nearly the result of experiments made at Ogden a year ago.

Mr. MANN. You are aware of the experience they had at Niagara, are you not?

General ABBOT. Yes, sir.

Mr. MANN. That they were unable to transmit electricity there without loss?

General ABBOT. Electricity should be transmitted at a high voltage and then reduced in a reducer for doing the work; and with high voltage it is possible to reduce the loss of transmission very much.

This information was only communicated to me within the last two or three days, and it more than confirms our estimates. This Union Light and Power Company of Salt Lake and Ogden is now supplying the electrical current for commercial purposes, as I have said, to the citizens of Salt Lake, at a distance of 35 miles.

The CHAIRMAN. I would suggest that that is comparatively an immaterial matter. What the committee want to hear is as to the feasibility of this construction so far as topography is concerned, and the assurance of construction so far as finance is concerned.

General ABBOT. I will come to the question of cost.

Mr. HAWLEY. Before you do that I desire to revert to the statement you made that the locks as proposed would accommodate ten vessels; that ten is the maximum number.

General ABBOT. That is the number estimated at 2,000 tons per vessel.

Mr. HAWLEY. If the canal was operated at its full limit every day that would give you 3,600 vessels a year.

General ABBOT. Yes.

Mr. HAWLEY. Now, do you know the number of vessels that pass through the Suez Canal?

General ABBOT. We have all the figures here.

Mr. HAWLEY. You probably are aware that as many or about as many as that number pass through the Suez Canal every year.

General ABBOT. Therefore we have made provisions at our summit level for 35 cubic meters instead of 20 cubic meters, if we find it necessary, which would permit a greater number of ships to pass.

Mr. HAWLEY. But of course you could not have a regular feed of ships there every day?

General ABBOT. No.

Mr. HAWLEY. So this canal probably, as now proposed, would perhaps accommodate, in the way that commerce moved, two-thirds of the maximum capacity of the canal?

General ABBOT. The great trouble we have had, sir, has been to induce people to believe that we were going to have commerce enough to fully occupy it.

Mr. CURTIS (counsel for the Panama company). The chief engineer, Mr. Choron, suggests that General Abbot is mistaken there; that twenty vessels can pass a day.

General ABBOT. Ten in each direction. In speaking of ten vessels, of course I mean one way. If you take both directions I mean twenty.

Mr. HAWLEY. I did not understand you to say ten in each direction. I do not think you said so.

General ABBOT. I meant to say ten in one direction.

Mr. BARHAM. I would like to ask if there is a project of this kind in the world, or if there ever was such a project, a project like this, carried out, creating an artificial lake, carrying water in pipes, creating another artificial lake and an artificial waterway, as planned here. Is there any parallel to this in the world?

General ABBOT. The only difference is in the size of the vessels that are to go through. On the Monongahela River, with all that immense coal commerce, the passage is regulated on this principle of locks and dams. It is a well-known method of regulating rivers.

Now, with reference to the cost, all that I can say is this: That the Panama estimates are based upon actual experience. They have taken out 4,000,000 cubic yards, and they base their estimates on what they know the work has cost.

Mr. CURTIS. How much is it, General? What is the total estimate?

General ABBOT. About \$100,000,000 to complete the canal.

Mr. CURTIS. You say it will cost \$100,000,000?

General ABBOT. One hundred million dollars is a round sum giving the amount required to complete the canal in its present condition.

Mr. HAWLEY. Are you about to close your statement?

General ABBOT. Yes, sir.

Mr. HAWLEY. How much has been expended on the work up to the present time?

General ABBOT. I should prefer that Mr. Choron, the engineer, should answer that. I would prefer to confine myself simply to the engineering requirements. He is more familiar than I am with the work that has been done on the Isthmus.

Mr. HAWLEY. Your statement now is that taking the work in its present state, as far as it has been preserved, and conducting it to a conclusion, when this canal shall be ready for the commerce of the world, that \$100,000,000 will make it ready for business?

General ABBOT. That is the best estimate we can make, allowing

20 per cent for contingencies; that is, we make our figures and then add 20 per cent for contingencies.

Mr. HAWLEY. And the canal at that time will be in condition to accommodate twenty vessels a day?

General ABBOT. Ten or twelve in each direction.

Mr. HAWLEY. Of approximately 2,000 tons burden each, or 2,000 tons register?

General ABBOT. I have forgotten whether it is register or actual freight.

The CHAIRMAN. I understand you to say that you have personally observed all portions of this projected work?

General ABBOT. I have been over it and spent three weeks on it, and looked over every foot of the ground, and have seen all that can be seen.

The CHAIRMAN. Are you familiar with the surveys?

General ABBOT. Yes, sir; I have been through the reports very carefully. Everything was open to the members of the committee technique, and I am satisfied the work has been well and carefully done.

The CHAIRMAN. As an engineer are you satisfied as to its practicability?

General ABBOT. Entirely so. I will go further than that. I will say that there is nothing in it that has not been exceeded in difficulty elsewhere. For example, we have higher dams elsewhere. A dam is building in New York to-day 120 feet higher than that at Alhajuela. Many earth dams are existing to-day of a larger size than this contemplated one at Bohio. The question of the Culebra is—there has been no excavation elsewhere as large as that projected—but that is a question of machinery and material. We have investigated the material and we know what that is. The machinery, of course, can be obtained; that is, any new machinery that may be needed.

Mr. HAWLEY. What is the depth of the harbor at Colon?

General ABBOT. It is available to any kind of vessel that the business demands. I think it is 30 feet.

Mr. HAWLEY. What is the depth of water at Panama?

General ABBOT. Thirty feet here [indicating on map]; and it should be understood that the inner harbor of Panama does not accommodate large vessels. It is not possible for large vessels to go to the end of the railroad wharves. They all stop here [indicating on map], where there is a large anchorage. These islands are high, and protect the ships against the wind. I have seen half a dozen large steamers lying there at the same time. They are going constantly backward and forward from South America and from our country. They unload into lighters, which are towed around and landed here [indicating on map] on the wharf of the Panama Railroad Company and carried across the isthmus. The Panama company has completed here, at La Boca, a pier 1,000 feet long, with a view of having vessels coming here [indicating on map] and unloading direct on a branch of the railroad, which will save that lighterage. That has been actually constructed during the last year or two, at an expense of over \$1,000,000.

Mr. HAWLEY. Is that actually completed?

General ABBOT. Yes, sir; the piers are completed.

Mr. HAWLEY. Is it to that point that the canal will be built?

General ABBOT. Yes, sir; it is directly on the line of the canal.

Mr. HAWLEY. What is the depth of the water there?

General ABBOT. That is about—I think they have it down to 8 meters now; about 27 or 28 feet.

A BYSTANDER. Is that channel constructed?

General ABBOT. Yes, sir.

A BYSTANDER. Up to La Boca pier?

General ABBOT. Yes, sir.

A BYSTANDER. Which is this new pier which has been built at the cost of \$1,000,000?

Mr. CROMWELL (counsel for the Panama company). How long will it take to complete this canal?

General ABBOT. The estimate is based on the belief that the same time would be required to complete the excavation through the Culebra as would be required for all the works down here at Bohio [indicating]. That time we put at ten years, to be conservative. We hope, with the new machinery and improved methods that have come up in the last few years, for which a great deal has been done at Chicago, that we may be able to reduce that time. But ten years we fix as the maximum from the time of beginning work on a large scale. We have the railroad parallel to the canal already working, and we have every facility for immediately beginning the work. That will enable us to reduce the time.

Mr. MANN. I understood you to state that it will cost about \$100,000,000 to finish the canal?

General ABBOT. Yes, sir.

Mr. MANN. Is that based on the proposition that the cost of finishing it will be the same in proportion as the cost of the work already done?

General ABBOT. By no means; it is based on the operations of the new company.

Mr. MANN. I mean the work on the ground; the experience of the old company on the ground. Do you take that as a basis—

General ABBOT. Not at all.

Mr. MANN (continuing). For future work, or do you estimate without regard to that?

General ABBOT. We base our limit prices on the work of the new company in taking out 4,000,000 cubic yards.

Mr. MANN. You take the estimates, then, of what the new company has done and reject entirely the experience of the old company?

General ABBOT. We are well aware that the system of administration in the old company was not that which would be carried out in the new company.

Mr. MANN. I am simply asking for the facts.

General ABBOT. The cost is estimated on operations which have been conducted with care and with good engineers, and with every provision for good work.

Mr. MANN. Then if the new company should in fact, when it goes to work, have about the same financial administration that the old company had, the canal would cost a good deal more than your estimate?

General ABBOT. Of course; that applies to anything—

Mr. MANN. But I am talking about this. I am talking about facts now.

General ABBOT. Well, the new company is organized on an entirely new basis.

Mr. MANN. I was simply trying to get at the facts.

General ABBOT. The fact is, we assume honest administration.

Mr. MANN. I do not know that the other was not an honest administration. The same people are engaged in it very largely; not the same persons, but the same people. Now, as to the men working on the ground. As I understand it, 50 or 60 engineers are working there, and

3,000 or 4,000 persons besides that. What have those people been doing in the last few years? Where have they been working on the canal?

General ABBOT. On that 5-mile cut [indicating on map] and at La Boca.

Mr. MANN. How much of the canal have they constructed?

General ABBOT. They have not been constructing the canal.

Mr. MANN. What?

General ABBOT. It would be an error to say that they have been constructing the canal with the view of completing the canal. They have been working in such a way as to enable them to make estimates on the cost—

Mr. MANN. They have not been doing actual work, then—

General ABBOT (continuing). And they have—

Mr. MANN. Let me finish. As far as carrying out the work of the canal is concerned, they have simply done preliminary work?

General ABBOT. No, sir; every cubic meter of material taken out has reduced the work. They have taken out 4,000,000 cubic yards.

Mr. MANN. Where are they working now?

General ABBOT. They have already completed the cut projected through the Emperador, and are now working through the Culebra, and are making a change in direction in the Panama Railroad to enable them to complete that cut to the projected depth—

Mr. MANN. Did you say, had completed a portion of the canal?

General ABBOT. No, sir; I said they had nearly completed the projected cunette.

Mr. MANN. That is for the purpose of helping the engineers to determine whether they can finish the canal at all?

General ABBOT. Partly that. It is to enable them to fix the price, and another object is to take that much material out of the canal prism.

Mr. MANN. But their purpose in doing the work, as I understood you to say, was to determine whether the canal can be finished; and, if so, at what cost.

General ABBOT. The work is conducted with a view of getting out that much material, which, of course, would be an aid in the construction of the canal, and at the same time to furnish a basis to estimate what the cost would be.

Mr. MANN. Have they finished any portion of the canal yet?

General ABBOT. No, sir; there is a good deal more to dig where they have been digging, but they have finished the canal so far as every meter they have taken out goes toward finishing the canal.

Mr. MANN. Have they finished the preliminary work? For instance, the cunette?

General ABBOT. The cunette is finished so far as the Emperador is concerned. That is the first $3\frac{1}{2}$ miles of the 5 miles. To finish the Culebra they are changing the route of the Panama Railroad, which crosses there [indicating on map], and of course the embankment can not be dug away so long as the trains run there.

Mr. MANN. They are now engaged in changing the route of the Panama Railroad, you say?

General ABBOT. There will be a change if we carry out this plan of completing a canal with locks.

Mr. MANN. What are the men there now doing?

General ABBOT. The men that are now working, the actual laborers, are completing the cunette in the Culebra, and are engaged in changing

this part of the railroad where it crosses the line to enable the excavation to be carried through.

Mr. MANN. And what are the engineers doing?

General ABBOT. Some of them are engaged in superintending the local work there and at La Boca. Very expensive work has been done there. The engineers have been very much employed up to the present time in making all these surveys I have indicated on the map.

Mr. STEWART. Can you furnish the pay rolls of the new Panama company, showing what they have paid out?

General ABBOT. Mr. Choron, the chief engineer, can answer that.

Mr. STEWART. What do you ask of the United States? What do you expect?

General ABBOT. I simply appear as a technical engineer—

Mr. STEWART. What do you conceive personally that the company asks from the United States?

General ABBOT. My personal wish is this—as an American, not as a representative of this company at all—I think the United States Government appreciates and the people of the country appreciate the necessity of an isthmian canal. I think before we actually begin to spend money that the whole subject ought to be investigated. Congress has appointed two commissions to investigate the Nicaraguan Canal, but since the collapse of the old company is quite ignorant of the progress and present conditions at Panama.

Mr. STEWART. You ask no money?

General ABBOT. None.

Mr. STEWART. You ask no franchise or corporate rights?

General ABBOT. Those questions will be answered by another person, who can answer them better than I can. You asked me my personal opinion. What I would desire would be to have an impartial hearing before a board of impartial engineers whose duty it would be to investigate the two canals and decide which would be the better. It is not worth while to construct two canals. The canal that is the better should be constructed.

Mr. BARHAM. You think that that investigation ought to be made now, considering the money that has already been expended?

General ABBOT. Undoubtedly I do, because the results of that expenditure are all favorable. All it requires is a moderate sum—less than any other canal—to complete it.

Mr. ADAMSON. I have often seen it stated that it was impossible to get water enough to supply that canal after it was finished. I want to know if after you get that artificial river and the canal and all your dams and locks finished whether you are absolutely sure of getting water enough to supply that canal?

General ABBOT. I give you my personal opinion, after spending days and nights in investigating that subject. I am perfectly satisfied that the supply of water is ample. When I first went to Paris all the records of the company were open to me, and I went over many documents and reports in relation to this matter to satisfy my mind upon it, because, as I have said, I went there prejudiced against this question of the Chagres. I thought the difficulties were insuperable; but after a full investigation I now express the opinion I have just expressed after two years of investigation.

Mr. ADAMSON. That river that you cross by means of those pipes is so low that you can not utilize it?

General ABBOT. How is that?

Mr. ADAMSON. That river that you carry your feeder across by means of pipes.

General ABBOT. Yes, sir.

Mr. CURTIS. Where you siphon the feed canal?

Mr. ADAMSON. The level of that river is so low you can not utilize it?

General ABBOT. It goes into the Chagres River.

Mr. ADAMSON. Farther down?

General ABBOT. Yes, sir; this river we are speaking about [indicating on map].

Mr. ADAMSON. But it does not come in soon enough for the purpose you use it for there—for the purpose you use that feeder for?

General ABBOT. No, sir.

Mr. BARHAM. What kind of pipe do you use for the siphons?

General ABBOT. Steel pipe.

Mr. MANN. Let me ask you one more question. My recollection is that in some of the literature that has been sent around you claim that two-fifths of the canal has been built. Does that mean two-fifths of the amount of cubic yards to be excavated in the canal?

General ABBOT. I will tell you what it means exactly. It is a little more than that. The figures are about 40,000,000 cubic meters taken out and about 50,000,000 to be taken out, which gives a little larger fraction than two fifths. The old company and the new company together have excavated about 40,000,000 cubic meters.

Mr. MANN. Out of 90,000,000 cubic meters?

General ABBOT. Yes, sir.

Mr. MANN. Then what portion of the cost of the canal will be embraced in constructing the dams and the artificial lakes?

General ABBOT. Those dams have all been carefully estimated, and the sum total aggregates, with 20 per cent contingency, over and above all the special items—

Mr. MANN. You have not answered my question yet. What proportion of the cost and what is the estimate of the cost of the dams and the artificial lakes?

General ABBOT. That question can be answered exactly, sir. It is made up here under "general excavation," under "locks," and so on. And now for the "dams" [looking over memorandum].

Mr. MANN. You can add to that later. You can go ahead with something else.

General ABBOT. Here is the sum for the Bohio dam and spillway, including dam structures, \$2,119,300. For the Alhajuela dam and spillway, including dam structures, \$2,356,700. We have here also for the minor dams, if you want them; but the aggregate for all the dams—the total expense for dams—is estimated at \$5,790,000.

A BYSTANDER. What are you reading?

General ABBOT. From the report of the committee technique, upon which the whole project is now based. All the items of the cost are made out in that way, and can be shown if desired.

Mr. CROMWELL. We will ask Mr. Louis Choron, who is chief engineer of the new Panama Canal Company, to now address the committee. He is the gentleman under whose direction this work has been done; he is a practical man. As Mr. Choron speaks French, and not the English language, I will have to tax you a little with an interpreter. Mr. Paul Seurot has come here for that purpose. Mr. Choron and the interpreter may both be sworn. I may add that Mr. Choron is a gentleman of special experience and knowledge of the figures and details of this work, and I invite the most searching questions, as freely and

as exacting as you please. He is a man who has worked on the ground, with the laborers under him, and he is a man of mathematics and a man of the highest character.

Mr. PAUL SEUROT was sworn by the chairman as the interpreter of the committee.

MR. CHORON'S STATEMENT.

Mr. LOUIS CHORON, chief engineer of the new Panama Canal Company, appeared as a witness and was sworn by the chairman of the committee.

Mr. CHORON said (he speaking French, and each sentence being interpreted by the interpreter):

Mr. Chairman and gentlemen, I beg you will excuse me for not speaking English, but I will try to be as clear and prompt as possible to enlighten you as to all the features of this project.

I wish to call your attention first to the preliminary works and surveys and the study which has been done by the old company, and which have been taken hold of by the new company. I also wish to call your attention to the value of the work which has been done by the new company and the arrangements which have been made by the new company. I want to show you that the exactness of our surveys and the thoroughness of our work will enable us to carry out the project of completing the canal. When such a work has to be done in an unknown country there are always many preliminary difficulties to be surmounted and expenses to be incurred on account of them. These preliminary works cost a good deal of time and money and worry to the old company. The money which has been expended by the old company will certainly be very useful to the new company. In such preliminary works there is always, first, the building of a railroad. At Panama this railroad, as you know, was already built, and extends from the one ocean to the other and follows very closely the line of the canal, and of course it affords all facilities for transportation of everything—materials, workmen, etc.

In building the canal the old company had to provide for lodging the workmen and for lodging the personnel, all its employees, and also to provide hospitals for the sick. The company has established buildings all along the line for the workmen and for the employees and for the sick people, and those constructions have been built in a very substantial way and are very comfortable. There are about 1,500 to 2,000 of such houses or buildings. The old company has left those buildings in very good condition, and the receiver appointed, as well as the new company, took care of those buildings.

Those buildings will accommodate about 20,000 laborers. They are located wherever there are important works to be done. Besides those buildings, the company has erected dwellings or storehouses for the materials, engines, etc.

Mr. STEWART. Don't you think it is advisable to get right at the feasibility of the canal? We don't care so much for the question of buildings, and so on, there.

The CHAIRMAN. I suppose you know what time you have?

Mr. CURTIS. What he is now stating was suggested by me, and suggested by a question asked by one of the members—as to the equipment, and so on. If the committee do not care to hear it, of course Mr. Chorón will confine himself to the work on the canal. He was about to tell as to the equipment. (Addressing the interpreter.) Please ask him to state the equipment, making his statement in regard to that

matter as brief as possible, as the committee desire to hear about the work done on the canal.

Mr. CHORON. Much left by the old company for the new company comprises the following items:

First, the plant for excavation above and below water. There are about 15 dredges of great power and 50 to 60 excavators; there are about 80 to 100 locomotives in very good condition; there are about 1,200 to 1,500 cars in very good condition for the transportation of material; there are a great number of small dump cars and hand cars; also there is a great amount of building material for railroad and track. All this plant and stock is taken good care of and well maintained. All this material cost the old company \$20,000,000 to \$25,000,000. It is in good condition, but some of it is out of date, and it will be necessary to replace some of it for that reason and on account of the improvements brought about in this class of machinery in the last ten or fifteen years. Three million dollars or \$3,500,000 will be sufficient to furnish all the material required to finish the canal. Having considered the preparatory work and installations, it is necessary to consider the works, properly so called, executed up to the present time by the old and new companies, and which will be useful in completing the canal.

The excavations and embankments already done amount to about 50,000,000 cubic yards. The amount necessary to be done by the new company amounts to about 66,000,000 cubic yards; that is, two-fifths of the total amount required has already been done. The new company, before undertaking the project of finishing the canal, wanted to know fully and exactly all the conditions of the isthmus, topographically and otherwise, in order to be sure that the project to be brought forward for completing the canal would be the most satisfactory, and have a complete guaranty of success.

They desired, at first, to throw light on the two most important subjects, to wit, the finishing of the excavation through the dividing ridge and regulating the Chagres River. You know, gentlemen, that the execution of the Culebra cut has been thought by many persons to be the great obstacle, which could be overcome only with the greatest difficulty, if at all. The new company wanted to know for a certainty, with no doubt whatever, that it could be made, and therefore they decided to start the work here. It is with this idea that the new company has taken hold of the Culebra cut at first, knowing that if that cut could be done the rest could be easily finished.

When the new company undertook the work there were about 80 feet of cut already done at the deepest part of the cut, and the new company, since it has taken hold of the work, has done 80 to 85 feet more of the cut. By so doing the new company knew what kind of material it had handled, how much it must cost to remove such material, and how long it would take to complete the work.

Mr. STEWART. Were you connected with the old company?

Mr. CHORON. No, sir; I have been connected with the new company for three and one-half years, and I am the chief engineer of construction, and I have had no connection whatever with the old company.

The cut which we have made in the Culebra is not quite as wide as will be required to make the full width for the canal, but we know what material we will have to handle, and we know how we will finish it to bring it to the required width. Now, for all the cut there, from Emperador to Culebra, there remain to be done about 31,000,000 cubic yards. The largest part of this work will be the enlarging of the cut already made.

We know now that with the ground we have gone through there is no danger of sliding, or falling, or crumbling.

The old company had a good deal of trouble to excavate the first 80 feet of cut on the upper layer. This upper layer, which was of a clayey composition, is stable now, and the vegetation has grown—trees and so on—so that there is no danger now of sliding or washing, and now under this upper layer remains a kind of disintegrated rock which is neither rock nor earth, but which is very stiff and which stands nearly vertical when it is cut. There is no doubt now that the cut can be excavated as it was proposed, and even deeper than it was proposed, without danger, and we have stopped at the level decided upon simply to save time.

If we had not taken into consideration the time required to complete the canal we might excavate still lower than we propose to do. We are now quite sure that we can successfully complete the cut. The first difficulty is therefore overcome. It remains now to consider the second, the regulation of the Chagres River. The Chagres River flows from this point [indicating on map] to Colon, 38 miles. For this 38 miles the Chagres River is located near where the canal must be located. If we wanted to make a canal without locks we should have to contend with a current, and the flow, which is very great. To give to the canal the place which is now occupied by the Chagres River we must, of course, divert the Chagres River.

This is a question which never was solved satisfactorily by the old company, and which was thought by many to be insurmountable with a sea-level canal, but with a canal with locks it was easy to solve the problem. The new company thinks this will not be difficult to do by building a dam at this point [indicating on map], which will keep the water behind the dam, of course, and will create a great lake in all this region [indicating on map at Bohio]. And by building this dam at this point the Chagres River will be transformed into a lake, the velocity of its current will be stopped, and it can no longer be of injury to the canal or to its navigation, and what flows through the weirs will not interfere with the navigation of the lower level.

From this point [indicating on map] the excess of water will flow through lateral channels isolated from the canal. This excess of flow, which is to be carried by two lateral channels, is 1,560 cubic yards per second. This excess of the water will flow in two channels, one on the left side of the canal, which will carry 650 cubic yards per second, and the other on the right side, which will carry 910 cubic yards per second.

Those two diversions are all that are to be made, and all that is to be done now is to complete the embankments which will be constructed between these channels and the canal, and which are in large part constructed already. These embankments will protect the canal from any overflow which might happen in the channels in case the company shall not have made ample provision to take care of the water that is flowing in those channels. The total area of the lake at the level it must take behind the dam is 13,585 acres, and in case of excessive floods we have allowed a leeway of 3 meters—about 9 feet.

Mr. CROMWELL. I would suggest that the witness speak of the feasibility and practicability of the whole plan, as it is now growing close to 4 o'clock, when the hearing must be concluded.

Mr. CHORON. The feasibility of finishing the work involves, of course, the feasibility of taking care of the Chagres River and the other projects. The feasibility of finishing the cut at Culebra has been spoken

of before, and we must consider that as being solved. The other difficulty (the Chagres) we take care of by making a lake which will take the excess of water, and then another lake—

Mr. STEWART. Right there let me ask a question. Is not that a new difficulty in engineering?

Mr. CHORON. These questions have been solved many times already. We can find examples of such works everywhere, which have been done lately, too. This is much less formidable than many other dams which have been built in other countries [pointing to the dam at Bohio]. We have in France many dams, such dams as these, earth dams, which have a greater elevation than this one. So it is a current problem to be solved by engineers, which is solved by them every day, as it is met. As to the other dam—I have mentioned the dam which is on rock foundation, and which is very easily built—it is very practicable. There are a good many such built which have larger dimensions than this one.

Mr. BARHAM. Taking a torrential stream like this, let me ask you whether there is a parallel in the world anywhere where it is controlled as it is proposed to be controlled in this case?

Mr. CHORON. The current of the Chagres River is not so great as the current of many other rivers. As to the volume of water, it is a good deal less than the Potomac River, for example.

Mr. BARHAM. Does he say that there were streams of a torrential nature like this that have been controlled?

Mr. CHORON. I know of many such streams where that has been done, but whose volume of water is not so great as this one.

Mr. BARHAM. I do not understand the answer.

Mr. CHORON. I know of other torrential streams which have been dammed, but I do not know of any such torrential stream having the same volume of water.

Mr. BARHAM. Then he does not know of any such case in the world.

Mr. CHORON. In such a case the current of the water should be stopped. There is no difficulty in building it—the dam—provided you divert the stream during construction.

Mr. BARHAM. I was not talking about a dam. I was talking about controlling a torrential stream of that kind.

Mr. CHORON. There is no difficulty in controlling the current of a torrential stream provided you make a reservoir for it—for the water.

Mr. BARHAM. Is there any case of a torrential stream which has been controlled as you propose to control this one?

Mr. CHORON. I do not know of any so important as this, but I know of others where that has been done, in Switzerland and America, and also in Austria, where dams have been built for such purposes.

There is no difficulty whatever in controlling the Chagres River after the dam has been built. The only difficulty is to build the dam, but from the moment when the dam is completed the Chagres will be forcibly and naturally regulated.

Mr. CURTIS. How is that done?

Mr. CHORON. The floods in the Chagres River happen only during a brief period of the year.

Mr. STEWART. How deep is the Chagres River where the proposed dam at Alhajuela is to be built?

Mr. CHORON. There are about 5 meters, or 15 feet, of water in ordinary floods.

Mr. BARHAM. And how much does it rise in an hour, sometimes?

Mr. CHORON. It may rise 20 to 23 feet, at the most, during twenty-four hours.

Mr. BARHAM. Don't you know that it rises from 40 to 50 feet sometimes?

Mr. CHORON. No; it never goes above 23 feet at Alhajuela.

Mr. BARHAM. Does he know that?

Mr. CHORON. At Bohio it may reach about 30 feet.

Mr. STEWART. Is that in addition to the normal depth of water in the river?

Mr. CHORON. The normal condition of the river is nothing or nearly nothing—about 3 feet of water, in a very low stage of the water—and this rise which I speak of is above that low stage.

Mr. BARHAM. Have you ever been over the ground?

Mr. CHORON. I have been over the ground twice, and spent each time one month and a half on the isthmus, and I have inspected very carefully all the works.

Mr. BARHAM. Where you there during high water, when torrential waters were passing down?

Mr. CHORON. I was not there during the great flood time.

Mr. CURTIS. Please describe quickly the width and size of the canal and of locks from one end of the canal to the other.

Mr. CHORON. The width of the bottom of the canal varies from one level to the other. At the first level, called the sea level, the width is about 95 to 100 feet in width. In the second level it is from 165 to 175 feet in width. This is for the purpose of allowing two boats to pass through at the same time in that level. In the dividing ridge (or summit level) the width is 118 feet. In the two other levels the width is the same as it is in the first level, that is, from 95 to 100 feet in width. And in the last level, out to the ocean, the width is from 100 to 160 feet; and the slopes are very easy, so as to allow the passage of two boats.

Mr. CURTIS. How many vessels can pass through the canal and the locks in a day?

Mr. CHORON. The number of boats which can pass in the canal is determined by the number of boats which can pass the locks. Each lock comprises two chambers, side by side. In each lock chamber twenty boats at least can pass in twenty-four hours—in both directions.

Mr. STEWART. How long does it take a boat to pass over one of these locks?

Mr. CHORON. We figure that the time would be exactly forty-five minutes; but to allow for delays, etc., we say that it would be about an hour or an hour and a quarter.

Mr. CROMWELL. What would be the time of transit through the canal from one end to the other.

Mr. CHORON. The total time taken in passing from one end of the canal to the other is fifteen hours.

Mr. CURTIS. What will be the current in the canal when completed?

Mr. CHORON. There should be none.

Mr. DAVIS. I want to ask him what his views are about the water supply during the dry months.

Mr. CHORON. During the dry season we have left a leeway of 5 meters in the reservoir at Alhajuela. This reservoir may furnish about 190,000,000 cubic yards.

Mr. STEWART. Does that last during the entire dry season?

Mr. CHORON. It is more than necessary during the whole time of the dry season.

Mr. BARHAM. Have you located the dams yet?

Mr. CHORON. Yes, sir; very exactly.

Mr. STEWART. Well, why would it take ten years to complete this canal if so much of it has already been done?

Mr. CHORON. We have based our figures as to the time which it will take to complete the canal on the time which will be necessary to do this part of the work which is what we might call the key of the work—the keystone of the whole project [indicating the locks and dam at Bohio]. Here we must first build two locks and afterwards a dam; and both of those things can not be done at the same time, because to be able to build a dam we must divert the river there.

Mr. STEWART. Would not that dam be built in a very few months?

Mr. CHORON. We need four years to build the dam, and the building of the locks will take four years also, and both can not be done at the same time. Of course that makes eight years. But to give a larger margin, we say it would take about ten years for contingencies and for unforeseen things. These works are the works which delay the execution of the project.

Mr. STEWART. Could not a dam and a lock be built contemporaneously; that is, when a part of the dam was completed?

Mr. CURTIS. He says that while he is building the dam he must divert the river. He completes the lock first and turns the river into the canal and locks, and thus diverts the river; but he has to build the locks first, and that takes four years. Then, while he is running his river through the canal and locks he is building the dam. Pardon me for interrupting, but that is what the witness says.

Is this engineering problem of completing this Panama Canal, according to the plan, feasible and practicable?

Mr. CHORON. There is no doubt that to build the canal and locks and finish the canal complete—there is no difficulty in completing the work with entire certainty of success.

Mr. STEWART. But at one time you were in doubt, were you not, as to the practicability of the Panama Canal?

Mr. CHORON. When I joined the new company I was under the impression, as everybody was, that many things in the scheme were, perhaps, not feasible. But after months of study and careful researches I became certain that the work could be done in time.

Mr. CURTIS. What did it cost the new company to get at this result—to make its surveys, and get at the plan?

Mr. CHORON. All the surveys and studies have taken about three years in the Isthmus. And the number of agents, of employees, and engineers employed steadily during that length of time has been about 150. Those agents were under the direction of the resident engineer, who in turn was under my own direction. The yearly expenditure for the agents, engineers, and so on, was about \$300,000.

Mr. STEWART. How many years has it been going on?

Mr. CHORON. Three and one-half years.

Mr. CURTIS. And how many men have been employed?

Mr. CHORON. During the time when the new company had their engineers and agents there during the surveys, they also had their workmen, numbering at least 3,000, doing the work under the direction of about ten agents, who were also under the direction of the resident engineer.

Mr. STEWART. What will be the complete cost when finished?

Mr. CHORON. The canal has been estimated to cost from about \$95,000,000 to \$100,000,000 altogether.

Mr. STEWART. About how many millions have been expended already by the old company and the new company?

Mr. CHORON. About \$94,000,000 or \$95,000,000 have been expended upon the canal works proper by the old company and the new company together.

Mr. STEWART. Don't you know that over \$200,000,000 have been expended—

Mr. CURTIS. That is right. [Addressing the interpreter:] Please state to the witness that that means the total amount of work.

Mr. CHORON (continuing answer). The old company has spent altogether about \$200,000,000, but some of that money has not been expended on the work proper.

Mr. CURTIS. Now, as to the money spent in good faith and by the old and new companies, and which represents value there now, how much is it?

Mr. STEWART. The committee would like to know the amount of money given by the poor people of France into this old company?

Mr. CURTIS. He says it was upward of \$200,000,000.

Mr. STEWART. Do you know the amount contributed by the people of France to De Lesseps and his son?

Mr. CHORON. I do not know anything about it.

Mr. STEWART. Don't you propose to give the shareholders of France—the poor people that gave this money—don't you propose to give them some interest in this matter?

Mr. CURTIS. If you will pardon me, my partner made a statement that covered that.

Mr. STEWART. If there was any surplus, I understood you to say.

Mr. CROMWELL. Surplus income.

Mr. MANN. You say it would take about \$100,000,000 to complete the canal?

Mr. CHORON. \$95,000,000 to \$100,000,000.

Mr. MANN. Have you got the money?

Mr. CHORON. The company has the money, or the promise of getting the money, but I myself am a technical man, an engineer, and have never had anything to do with the financial side of the question, or the political side, or the general administration.

Mr. STEWART. Do you propose to raise this money in France or the United States?

Mr. CURTIS. I do not think there is any limit as to where the money will be raised. I hope it will come from both countries.

The CHAIRMAN. I would like to ask the witness if he has a translated copy of the report of the international commission that has been referred to.

Mr. CURTIS. General Abbot has it.

The CHAIRMAN. We will be glad to have a copy of that.

Mr. CROMWELL. We will furnish that, then; we will furnish you the report.

The CHAIRMAN. I think that this committee would like to be advised of another very important matter. I suggested there were two questions we would, no doubt, like to have light about. One was as to the practicability of this canal. Gentlemen have heretofore confined themselves solely to that question and to engineering matters. Another question, quite as important, will be the financial ability. Now, is there some gentleman present who proposes to speak in regard to that matter?

Mr. CROMWELL. I suppose I should respond to your natural inquiry, and I will, by saying that the New Panama Canal Company, not soliciting any aid financially from this Government, has not deemed it to be necessary to go into the condition of its finances, although I wish to respond in a general way—

The CHAIRMAN. Excuse me; I think it important for this matter.

Mr. CROMWELL. It is important. I appreciate it. And yet, you

understand, I am not prepared to speak exactly. The executive officers, the board of directors, could alone answer your questions to your full satisfaction. But I can say to-day that the company, having assets of over \$100,000,000, and therefore having an asset upon which capital can be raised, and having put in \$13,000,000 of its own money, and having some millions of money unexpended—that all being so, the company is not bound, as a practical matter, to confront that question to-day. It has millions of dollars to go on with this work, and it has very large resources and a very powerful board of directors, composed of the most prominent bankers in all France, and of great resources. Its resources are very large. It has confidence in its own financial ability. That confidence is unwavering, and when it reaches the point where it desires to make any issue of securities, it will base the issue upon values and conditions which will invite general confidence. It is a very natural question that you have asked me, and one which I have answered to the best of my ability, by which I mean that our company is quite content with its resources; is pursuing its work; has entire reliance upon its resources to complete the work without Government aid; and with the present resources, which are ample for years to come, it has no apprehension upon that question.

Mr. ADAMSON. Then it is true that all you ask of this Government is that we leave the field clear to you?

Mr. CROMWELL. I have not asked that.

Mr. ADAMSON. Then what is the object of this hearing if you ask nothing?

Mr. CROMWELL. Is not the exhibition here made an answer to your question? If the committee and the Government have no interest in this great question I should be greatly surprised.

Mr. STEWART. Don't you think you ought to make the committee satisfied of your ability to go ahead? You have assets, but have you cash? The question is whether anyone would lend money on the assets that you have on a gigantic scheme like this. Ought you not to make the committee feel certain that you are able to go ahead and carry out this enterprise? No banker, no sensible banker certainly, would lend money on the assets you have—that is, on the canal project itself, the feasibility of which being a subject upon which engineers differ.

Mr. CROMWELL. There is no difference of opinion among engineers. Only two months ago these engineers signed the report which settles the question of the feasibility of the canal, a copy of which report I will submit on this hearing, as called for by the honorable chairman. That is a report which for thoroughness and exhaustiveness can not be excelled, and will leave no doubt in the minds of bankers, or in the mind of the honorable gentleman himself—

Mr. STEWART. If this Nicaragua Canal should be built would you still go on and complete your canal?

Mr. CROMWELL. Our company has no apprehensions on that question, and will pursue its course. Of course we must go ahead with the investment that is already made—with nearly half the canal completed. The company does not think that any other canal will be constructed.

Mr. MANN. I suppose that the only object of this hearing is for the purpose of showing that this canal may be finished and that as a necessary corollary two canals would not be successful. There is not business enough there for two canals. Your purpose, the only purpose, I assume, in not asking any money is to show that this canal can be and will be finished. If this Government should start to build another canal

it would build it. That might result in your not getting money enough to build your canal. If that is the case, and this hearing is for the purpose of showing that you can build the canal, don't you think that you ought to show the committee not only that you have the engineering ability to finish it, but the financial ability to finish it?

Mr. CROMWELL. The same apprehension has been before us for four years and has not made us waver for one instant.

Mr. MANN. The same apprehension has not been before your canal company, because the Government of the United States has not up to the present time started to build a canal.

Mr. CROMWELL. Has it started yet?

Mr. MANN. No; but it is contemplating it, and that is the reason you are here.

Mr. CROMWELL. I am here for what you have seen.

Mr. MANN. It is very plain that you are here for the purpose of showing, or trying to show, that your canal is likely to be built, and I suppose, of course, your object in showing that is to convince the Government that your canal will be built, and that it is not necessary, or not desirable, that any other canal should be built. I do not see why there should be any quibble—

Mr. CROMWELL. I do not mean to quibble at all. But the Government of the United States guaranteed the sovereignty of the isthmus over which the canal is to run and is the party that ought to know what we are doing; and the moment that report was signed the director general of our company came here in person with the report and it was handed to the President of the United States on December 2 last.

Mr. MANN. There is another report (Nicaragua) that has been handed to the President of the United States.

Mr. CROMWELL. I have not seen it.

Mr. CURTIS. The preliminary report, you mean?

Mr. DAVIS. You know the Government of the United States, through its Congress, is investigating this question with a view of determining whether or not it will invest money in this enterprise. You come before the committee of Congress and show them you have a project other than the one they are considering, and of course your purpose is to show that the Government need not waste its money in helping to build this other canal. The point is, this Government is of course able to build the canal; if they undertake it they can build it. If the Government stops because of your enterprise, is it not right that your company should show us your ability to build the canal you propose. That is business on your part and business on the part of the Government.

The CHAIRMAN. And especially in view of this fact, that your company are successors to a discredited company, and are now taking up an enterprise that heretofore, by failure, has been discredited. I made the suggestion in absolute good faith, supposing that among the other purposes you had you would regard it as quite as important to show that you had the ability to build the canal as to show us that it was possible to build a canal—by somebody else, possibly.

Mr. CROMWELL. We show it, Mr. Chairman, by our work. If you mean by showing that we ought to have \$100,000,000 this minute, and before it is needed to be expended, even, that would be a question upon which I should hardly be pressed. No man raises \$100,000,000 years before he needs it. The loss of interest on that amount of money alone would be enormous.

Mr. MANN. When you speak of the amount of your assets, I want to get at just what you mean. The canal itself constitutes the bulk of your assets, does it not?

Mr. CROMWELL. Yes, sir.

Mr. MANN. How much did that canal cost this company?

Mr. CROMWELL. I endeavored to explain that, and I will be glad to repeat—

Mr. MANN. I have been very attentive. I have been an attentive listener.

Mr. CROMWELL. Yes, sir; I know you have. All the property without reserve was, by decrees of court—

Mr. MANN. I understand that, but how much did it cost the new company?

Mr. CROMWELL (continuing). Sold to the new company under agreements which provide as follows: That the new company should place in its treasury \$13,000,000 of fresh money. It did that, and of that \$13,000,000 some millions are still in the treasury. Further, that it would pay to the old stockholders, after all expenses of operation, maintenance, exploitation, dividends, reserve fund, etc., are provided for, a specified share of the surplus income—that is to say, after taking out the operating expenses, maintenance, sinking fund, reserves, and a moderate dividend to the new capital employed, that the balance remaining should be divided into two parts, and that 40 per cent should go to the shareholders of the new company and 60 per cent to the liquidator of the old company.

Mr. MANN. You said that was not a matter that was binding in any way—

Mr. CROMWELL. No, sir; it gave no voice in the management.

Mr. MANN. So the total assets of the company, leaving out the canal, are the \$13,000,000 which has been paid in, and an agreement?

Mr. CROMWELL. An agreement respecting the furnishing of fresh money.

Mr. MANN. I mean the assets. The total cost of the assets of the new company, of the \$100,000,000 of assets you speak of, is the \$13,000,000 and an agreement?

Mr. CROMWELL. And obligations made under that agreement—obligations to complete the work and to provide money for the completion of the work, and to complete the canal.

Mr. MANN. The obligations are not a part of the assets so far, are they? You have not given any other obligations than that agreement?

Mr. CROMWELL. No, sir; but that is obligation enough.

Mr. ADAMSON. It will only buy a part of the crop when it is paid, probably.

Mr. CROMWELL. That is purely a matter of agreement between the old interests and the new; and I simply say that the old security holders consider that a fair bargain and an equitable bargain.

Mr. ADAMSON. We haven't anything to do with that. But you estimate your assets at \$100,000,000. That is purely an estimate.

Mr. CURTIS. That is an appraisal.

Mr. ADAMSON. It has not cost that to you?

Mr. CROMWELL. That does not change its value.

Mr. ADAMSON. You don't think you could sell it for \$100,000,000?

Mr. CURTIS. It is an estimate based upon an appraisal made by a board composed of gentlemen who are of the highest character and of the highest ability.

Mr. MANN. What was that made for?

Mr. CURTIS. It was made as an estimate of value for the new company.

Mr. MANN. What was the object? There was nothing based upon the appraisement.

Mr. CURTIS. Not if I understand the question correctly. It was made for the purpose of the new company, as any new company would appraise its assets.

Mr. MANN. It was an inventory, in other words?

Mr. CURTIS. More formal than that. This company, for purposes of determining every question presented to it, submitted it to the most competent men in the country—a board composed of men of the very highest ability and character.

Mr. STEWART. Don't you think a court of equity in France would set aside any such agreement as unfair toward the old shareholders? If your assets were \$100,000,000 you would be getting \$100,000,000 for \$13,000,000. Don't you think a court of equity would set that aside?

Mr. CURTIS. As an American lawyer, I am bound to say that the rules of law in France are beyond my ken. But I will also say this: That neither in this country nor any other would a court of equity set aside an agreement of that kind, provided the agreement is executed—that is, the execution of this project.

Mr. ADAMSON. No matter how much those assets cost, the question is this: It appears your lowest estimate fixes these assets at \$100,000,000. What is there would not be worth anything unless the canal is completed. I understand what these gentlemen are driving at is to ascertain whether there is any way in sight by which the company can assure us that they can finish that canal.

Mr. CURTIS. Do you mean a guarantee to that effect?

Mr. ADAMSON. No; but to show that it will be done.

Mr. CURTIS. Isn't it fair to make an answer like this? Here is a project of the greatest magnitude, the solution of which has been, perhaps, in doubt until sixty days from to-day—that is, until the time this International Technique Commission officially placed their names to the report, and that was done on the 19th day of November, 1898. That report is only sixty days old. Upon the demonstration made in that report I suppose depends the completion of this work, physically, in a scientific way.

Mr. MANN. Then I suppose you apprehend, you expect, confidence to be inspired in a sufficient degree to enable you to build this?

Mr. CURTIS. I have no more doubt that it will be built than that I am standing here now.

Mr. MANN. That is your idea—that it will inspire confidence?

Mr. CURTIS. I am sure it will. There are a thousand reasons for being sure that it will be built.

Mr. MANN. Do you suppose you are any more confident than De Lesseps was in the beginning?

Mr. CURTIS. I think the conditions are different, and are such as to inspire confidence in—

Mr. MANN. The confidence is the same. I am speaking of the confidence.

Mr. CURTIS (continuing). Gentlemen who are conservative.

Mr. MANN. You do not consider that you are better qualified to pass upon this matter than he was?

Mr. HAWLEY. De Lesseps raised the money.

Mr. MANN. He didn't finish the canal. He had the same confidence about finishing it.

Mr. CURTIS. I am only saying this. The world recognizes the fact, and especially the American people recognize the fact, that there is to be a trans-isthmian canal. There is no question about that. That is bound to come. Where is it to be? It is to be where the route is the best, where the project is the safest, and where it is shortest and best for the commercial community and this country. We say, with all due respect to the committee, that the demonstration which we can make (which of course can not be made completely in the limits of time afforded to us here) will satisfy every physical and engineering condition required. We ask the fullest investigation. If that be true, and if the conclusions and results reached by the International Commission be true, that this is the best trans-isthmian project, isn't it going to be built?

Mr. DAVIS. It might not be if some other trans-isthmian canal was completed before it. In such a case it might be abandoned. You say there is going to be one built. You say there is no question about that.

Mr. CURTIS. I assume that, sir.

Mr. DAVIS. This Government, we will say, is restless that it shall be built. According to your own statements here, it is going to take ten years to finish this canal. The question with us is: Shall this committee go into the House and advise withholding Government aid from any other canal unless you show the committee that you are able financially to complete the canal you are in favor of? All you have to do is to swap places with us and see the position we are in.

Mr. CROMWELL. I will give you a guarantee if you will give us the assurance.

Mr. CURTIS. And the guarantee will be as good as a bond of the United States. It will be such as will satisfy my friends who speak now, I think.

Mr. MANN. It ought to be produced.

Mr. CURTIS. It will be produced. But, gentlemen, are you willing to say as a committee that everything we have said to you now is correct? Upon the statements you have heard here to-day are you willing to rest the conclusion that everything is just as we say? Of course you would hardly be willing to go that far. We say, will you investigate? If you will do that you will see that all our statements are borne out by the record and by the facts.

Mr. CROMWELL. As soon as you do that and say that, I will give you a guarantee.

Mr. ADAMSON. If you can make a guarantee, why not finish it in less than ten years?

Mr. CROMWELL. We expect to finish it in less than ten years, but we want to make a conservative estimate.

Mr. CURTIS. I do not suppose that any gentleman here will treat with contempt the opinion of this board of engineers—

Mr. DAVIS. That is as to the physical aspect.

Mr. CURTIS. But the gentleman is talking about ten years of time. These gentlemen say it will take ten years of time, and when they say that, that is absolute with us. It can not be otherwise. If ten of the greatest engineers in the world were selected to report on any other project, you would say their conclusion was absolute, just as this is absolute with us. If you know of any more competent board to deal with this matter, we should be glad to have them act upon it. I don't know of any. I think that view and treatment of this question ought to be sufficient to inspire every member of this committee and every member of this community with confidence.

Mr. ADAMSON. And you say that the physical conditions are such that it can not be done short of ten years?

Mr. CURTIS. I do not pretend to know about the engineering features, not being an engineer and not having especially studied that. But I have given some attention to this subject, and I will perhaps be permitted to repeat what Mr. Choron and others say. They say that to build this would not require ten years of time provided you could carry on two parts of the work at once. You can not do that. You have to build your locks and divert the river first, and that will take four years, and while the river is running through the canal you will have to build your dam, and that will take four years more.

Mr. STEWART. This is a French corporation. You have a French charter, I presume, possibly alterable by the French Government. Could not the French Government at any time embarrass the United States in the use of that canal, supposing it were built? Could not France repeal or alter or modify the charter to the injury and the embarrassment of the United States?

Mr. CURTIS. I do not know that to be the fact, sir.

Mr. STEWART. I am assuming that she follows the civil law.

Mr. CURTIS. That relates to the mere administration of the corporation's affairs; that is a part of the character of the corporation itself.

Mr. STEWART. But we want a canal—

Mr. CURTIS. Let me answer your question. The operation and use of that canal is not determined by the laws of France at all. It is determined by the treaty made with this country and by the concessions given to the company by the United States of Colombia, and that is what determines the operations of the canal. Therefore nothing could embarrass the United States except the United States of Colombia changing that treaty and the concessions.

Mr. STEWART. But we want a canal controlled by the United States, uncomplicated by any country, like France or Colombia, and that would be one view which would perhaps bias the committee against any Panama canal.

Mr. BARHAM. We could not have that under your plan.

Mr. CURTIS. You are suggesting a political question which it perhaps does not become me to speak about. I mean in a legal view. Perhaps if we could get together and talk about this we might agree. There is a policy, there is a theory, there is a philosophy about this subject which I think this committee will reach. But it will not be found in any public cry or any fictitious newspaper cry upon the subject, or in any ill-considered thought about it. What this Government will have and must have is a canal. It wants a canal that will be useful to it at all times—in war as well as in peace—from which it can get the most benefit. If it can get as much benefit and good from the construction of the Panama Canal as it can from any other without costing it a cent, it goes without saying that it should be the policy of the Government not to interfere with the construction of this canal; and we maintain that if this canal be completed that is the precise condition which this country will find itself in—that they will have a canal which will be as available at all times as any canal built with its own money.

Mr. BARHAM. You think, then, that if the Government should undertake to build the Nicaragua Canal it would interfere with you?

Mr. CURTIS. It would have a moral effect, yes, sir. I think it is true. I think that is common sense. I don't think ultimately it is going to affect the result, for that is inevitable; and if you think of it you will

see that it is inevitable. Whether this canal is going to be built by this company or some other company, it is inevitable that it is going to be built by somebody.

Mr. MANN. If it cost \$100,000,000 and there was a canal there that was not paying expenses you do not think that anybody would complete it then, do you?

Mr. CURTIS. Yes, sir. I do not wish to forfeit your confidence by making an ill-considered answer, but it seems to me that it can be as easily demonstrated that it will be completed then as that it will be completed if the other is not. It is inconceivable to me that it will not be built. Are the peoples of the world going to permit a great interoceanic waterway to be constructed and controlled by one country when a better water route is available? And I want to say to you now, gentlemen, that this canal will be completed before any other is half done.

Mr. MANN. That is prophecy, of course.

Mr. CURTIS. Yes; that is prophecy in one sense. What I mean to convey to your minds is this: That the necessities, the international necessities, of the case are going to undoubtedly compel that view.

Mr. MANN. Your object in appearing here is that you wish to prevent any complications that may arise by this Government helping to build another canal?

Mr. CURTIS. I would hardly put it that way. Our prime object is to invite your attention—

Mr. MANN. I say that your object is to prevent any complications arising by this Government going ahead—

Mr. CURTIS. It would tend to that.

Mr. MANN. You are not asking anything?

Mr. CURTIS. No, sir.

Mr. MANN. What earthly object could you have except to prevent, if possible, the Government helping to build another canal? Are you willing, on behalf of the Panama Company, to make any showing in writing in regard to the ability of your company to raise the money or in regard to guarantees for raising the money?

Mr. CURTIS. Your colleague just suggested here that if this committee is prepared to go to the House and to the Senate and say that they have investigated this enterprise and think it is feasible and practicable and can be completed in the time specified, whether we could give guarantees of a satisfactory character in respect to our ability to raise the necessary sums. I want to say to you now, gentlemen, and I say it broadly without any qualification, that if this committee were prepared to do that, I have not any doubt in the world—I have not the authority this minute, but we will furnish the authority to the committee—that the guarantee will be furnished to you so that we will leave it to the gentleman himself to say whether or not it is sufficient.

Mr. MANN. That makes two bites of a cherry, and the committee does not do that. Are you willing to give any guarantee or statement that will convince the committee now—

Mr. CURTIS. As to what?

Mr. MANN. As to your financial ability.

Mr. CURTIS. Based upon the report of the committee—

Mr. MANN. Based upon the facts that are in your possession now. We do not consider that we are obliged to make any report to the House in regard to this. For all we know your enterprise may go up in smoke.

Mr. STEWART. You know the concessions of the Maritime Canal Company expire next October, and you can see why it is quite necessary to get this assurance from you at once.

Mr. CURTIS. I think this committee will give us credit for maintaining a dignified position for the last four years in respect to this business. We have refrained from making any comparisons with the Nicaragua Canal proposition. We have refrained from making any opposition in name or directly against that. We are endeavoring to present the practicability and feasibility of this by evidence, which can not be furnished by any other canal company in the world.

Mr. MANN. I suppose, though, that some other company will come in here and furnish the same things——

Mr. CURTIS. It can not be done. General Abbot will tell you that he has never seen a project worked out with such thoroughness and ability in his life as this one has been worked out.

Mr. MANN. Everybody will assume that somebody can build a canal. The point is, are you prepared now to make any showing to the committee in regard to the ability of the new company to go ahead and raise the \$100,000,000 necessary to build this canal?

Mr. CURTIS. We have stated very fully that the company has not a dollar of indebtedness, but has millions of dollars of cash, and feels no doubt whatever of its ability to continue this work and complete the canal.

Mr. MANN. Are you prepared now to show that you have any further money at your command——

Mr. CROMWELL. We do not need it now.

Mr. MANN. I did not say that. I said are you prepared now——

Mr. CROMWELL. Yes, sir; a company composed of men of the highest financial ability.

Mr. MANN. I don't care about that.

Mr. CROMWELL. Doesn't that indicate ability?

Mr. MANN. No.

Mr. STEWART. They have the ability, but perhaps they would not have the disposition.

Mr. CROMWELL. That may be true.

Mr. MANN. I wish you would do me the courtesy to answer my question.

Mr. CURTIS. You are asking me a categorical question, which I hardly think is fair. We should be very glad to bring before this committee one of the general managers——

Mr. MANN. I should think you could answer my question.

Mr. CURTIS. We are not prepared now to go any further than we have gone.

The CHAIRMAN. The time has more than expired.

Mr. CROMWELL. We thank the chairman and the gentlemen of the committee very much for the hearing.

Adjourned.

SUPPLEMENTAL STATEMENT OF MR. CHORON.

To the honorable the members of the Committee on Interstate and Foreign Commerce of the House of Representatives.

GENTLEMEN: At the hearing recently granted to the representatives of the new Panama Canal Company by your committee I labored under the misfortune of being unable to speak to you in English and was also further embarrassed by the limited amount of time at my disposal. For these reasons I regret to say that I was not able to make a full, complete, and intelligent statement of the material features relating to

the new Panama Canal Company, its works, projects, engineering features, etc.

I therefore respectfully ask your indulgence in permitting me to submit in writing, and under the oath administered to me by your chairman, a further statement.

I will discuss the subject under three heads:

First. The amount and character of the work accomplished on the Isthmus of Panama by the new Panama Canal Company.

Second. The conditions and various problems which the new company has considered, and the final solution it has determined upon; also the feasibility and practicability of completing the canal under these plans.

Third. The very great advantage the company now has in the completion of its project, owing to its organization, amount and character of work done, and the solution of the engineering difficulties.

The construction of a canal across the Isthmus of Panama has been supposed to be confronted by two insurmountable difficulties which the public has greatly magnified in importance.

It was claimed that one of these difficulties was the impossibility of excavating the great trench at Culebra, which was necessary in order to cross the summit of the Cordilleras, and the other the supposed impossibility of regulating and controlling the River Chagres, and the occasional floods which occur in it, in such a way as to render them inoffensive and harmless to the canal, which, for a considerable distance, crosses the isthmus in the vicinity of or near to the river.

To dispose of the problem of the Culebra and to remove the theoretical objections it was necessary actually to dig the trench, and thus finally and definitely to set at rest all doubt upon the subject. The new company thereupon decided that before resuming work upon the entire line of the canal it would devote itself to the work of excavation on a large scale at the most difficult point, at the only place where there was any supposed or real difficulty in excavating, and where it had been claimed that success was doubtful—that is, in the Central Mass, which includes that portion of the canal between Emperador and Culebra. It was desired to carry on the work to such an extent as to enable the company to demonstrate with absolute certainty the possibility of successfully completing the excavation to the fullest extent that any possible solution of the canal project would require, and also to demonstrate the stable character of the materials in which the canal would eventually be built.

This work of excavation, which has been conducted upon the line of the canal as an integral part of the work necessary for the full and final completion of the canal, is now completed. In its conduct about 3,000 men have been employed for the past four years in active and continuous work. The total amount of material excavated during this period by the new company is about 4,000,000 cubic yards. Including the amount actually done by the old company and by the new between Culebra and Emperador, the cut averages about 100 feet; the greatest depth of cut already done is 165 feet in depth, and the average cut remaining to be done is only 80 feet. The amount of work thus accomplished on the entire length of the cut has afforded an absolute and indubitable demonstration of the actual nature and character of the ground of this section of the canal and its stability throughout its entire length.

The new company has also sunk many pits, 6 feet in width, to the lowest possible level of the canal to demonstrate the character of the material below the actual excavation, and thereby ascertained that

the character of the soil below the present level actually excavated is the same as that in the work already done upon the surface. A tunnel has also been dug 1,100 feet in length under the present surface, which has also assisted in determining the character of the material. The result of all this work is to determine absolutely that the upper layer, consisting of about 75 feet, which was principally clay and subject to sliding, is schist, which is a material little harder than ordinary earth and softer than hard rock. This material is not difficult to excavate, and yet furnishes perfect stability and security for the sides of the canal as already excavated, which have stood for many years and will stand forever without ending. The cost of removing this material has been determined by the new company, from actual experience, to be not more than 75 cents per cubic yard.

The doubt existing concerning the completion of the canal has, therefore, been absolutely disposed of by the work already accomplished and without waiting for the actual completion of the great cut at Culebra. The objections raised as to this portion of the project are absolutely disposed of before the completion of the canal.

The first of the two fundamental difficulties, concerning which a question has been raised, has been fully solved and demonstrated not in reality to exist. The digging of the canal at this point, while an important piece of work, is simply a question of time and money, the solution of which depends altogether upon the level adopted for the summit level of the canal.

The second fundamental difficulty, which arises from the question of controlling the floods of the Chagres and limiting its flow at a point where it approaches the neighborhood of the canal, and to eliminate any danger to the canal and its navigation, presents a very important hydraulic problem, the solution of which requires the most complete knowledge of the flow, volume, and floods of the river. It also requires very extended and exact surveys of the topography of the surrounding country to determine under what conditions it is possible to carry out the important features of the work which must be considered in the solution of this problem and the consequences which will result from its completion.

The principle generally adopted by all engineers for the solution of this problem consists, wherever possible, of creating, by means of dams at favorable points, large artificial reservoirs or lakes, in which the great floods of the river will be impounded during their greatest intensity and stored during the period of maximum flow of the river, thus restraining and keeping within reasonable and harmless limits the quantity of water flowing from the lakes or reservoirs. This is the method applied to remedy and control the floods of the great rivers in various countries, notably in France, and is the same method provided for the regulation of the floods of the San Juan River by various engineers who have examined the Nicaragua Canal project. The extent and volume of the San Juan River is very much in excess of the Chagres.

It is for this reason that the new company has thus solved the problem of the Panama Canal. It has been possible for this company to obtain absolute knowledge of the extent and character of the floods and flow of the Chagres, because of the systematic and regular observations made of the flow of the river during a long series of years, at first by the old company, from 1881 down to the time of its failure; since then, by the representatives of the liquidator, residing at the Isthmus, and recently (since 1894) by the officials of the new company. Reli-

ance has also been placed upon observations and data obtained by the Panama Railroad Company, including a period long prior to the origin of the old Panama Company. These three sources of information constitute volumes of data and information collected and preserved in the archives of the old and new company, which have furnished conclusive information concerning the most unfavorable conditions which must be met, and to which the works of the canal will be exposed by the floods of the Chagres River.

Numerous surveys have been made of the contours of the land where the lakes are to be created, which are in themselves absolutely complete, and furnish reliable data concerning the topography of the country. Careful and numerous borings and test pits have been made and sunk for the purpose of obtaining exact knowledge concerning the soil of the locality where the dams and other works are to be built for the purpose of creating the large lakes, and which has resulted in furnishing absolute knowledge of the conditions to be met in the construction of these works. One of the localities in which important works are to be erected is at Bohio, 14 miles from Colon, where the valley is narrow and permits the construction of a dam.

The side slopes of the valley are of a rocky formation; this rocky stratum maintains its general downward direction and may be found at a very great depth, but it is covered by a layer of clay very compact and of ancient formation which forms the bottom of the valley. Owing to the character of this soil it was decided that an earth dam would be much more desirable than a masonry dam. This proposed dam would measure in height 75.5 feet and the length of its crest will be 1,286 feet and it is intended to raise the water to a maximum height of 65.5 feet. Many dams of the same character have been built and some of even larger dimensions. Among these we might point out, for instance, the dams built by Mr. Fteley, chief engineer of the New York aqueduct commissioners. There is then nothing exceptional in reference to this dam and there can be no doubt as to its feasibility and stability. This question has been carefully studied by the members of the international commission, all of whom are eminent engineers, and they have unanimously approved the plans of the company.

There is also no doubt about the successful construction of this dam, as it will be easy to divert the river by carrying it through the cut at the locks located near the dam, and which should be opened beforehand. The materials necessary for the erection of this dam are found in large quantity in the neighborhood. Its total cubic contents will be about 425,000 cubic yards of earth and 50,000 cubic yards of large blocks of stone.

The artificial lake created by the damming of the waters will constitute the second level of the canal, having an elevation varying from 52.5 to 65.5 feet above mean sea level. At its highest stage it will have a surface area of 13,585 acres. This area has been figured from the careful survey of the flow line at the elevation above stated. The volume specially reserved in this lake for temporary storage during flood time is about 5,292,000,000 cubic feet.

The second place where it is desirable to build a dam to control the Chagres River is situated in the upper part of the stream at a point called Albajuela, and which is about 9 miles from the canal. At this point the valley is very narrow, forming, as it were, a gorge or canyon cut through the solid rock. This ledge runs without interruption along the side slopes and at the bottom of the gorge as well, and is found at a depth of not more than 27 feet below the lowest stage of the river.

These conditions are the best possible for the construction of a masonry dam. The dam as proposed by the company will be made of concrete, measuring 164 feet in maximum height above its foundation and 935 feet in length at its crest. Its total cubic contents will be 196,500 cubic yards.

This dam is also much less formidable than a great number of other well-known dams the construction of which have given no difficulty. It will retain water to a maximum height of 128 feet above the lowest stage of the river. The topographical survey of the perimeter of this second lake was very carefully made. The computed average area is 6,175 acres. The space reserved for temporary storage in flood time is about 3,537,000,000 cubic feet. The control of the Chagres River will then be effected by the erection of these two dams and the creation of the storage lakes. These dams will also have wasteweirs with lifting gates which will allow the flood of water below the dams to be regulated as well.

A careful examination shows that the flow over the weir at Alhajuela will not exceed 24,300 cubic feet per second, and that the flow over the Bohio weirs will not exceed 42,390 cubic feet. Under these conditions, and in case of a flood as great as the greatest known flood during the last fifty years, the volume of water to be taken care of and kept in these storage lakes has been found to be 3,537,000,000 cubic feet at Alhajuela and 5,292,000,000 cubic feet at Bohio.

This maximum flow of 42,390 cubic feet per second at the Bohio weirs will be conducted to the ocean through special channels known as "derivation channels" and which were nearly completed by the old company. One located at the left of the canal will carry 17,550 cubic feet per second; the other, on the right, will carry 24,840 cubic feet per second. If, however, it should happen that a greater flow of water should pass the weirs into these "derivation channels," the canal will be protected against the sudden rise of the water by embankments to be thrown up on both sides to insure its safety. So that we may now say with certainty that the two questions which have up to this day presented so many objections and which would, as it was claimed, jeopardize the whole canal problem, have been solved in a satisfactory manner and the completion of the canal can be effected easily by following the plans adopted by the new company. All the studies and the observations, as well as the surveys necessary to give to this company the desired data, have been made with the greatest care under a rigid and exacting supervision. More than 150 engineers have been employed thereon for more than three years at a cost of not less than \$1,200,000.

GENERAL CONDITIONS AND PLANS PROPOSED FOR THE COMPLETION OF THE CANAL.

The general conditions as laid down by the new company can be considered under two headings:

The route, or location, and its successive levels.

The line of the canal is generally the same as the one established by the old company, work on which has been more or less carried on over its entire length.

The total length of the canal is 42.8 miles from its beginning at Colon, on the Bay of Limon on the Atlantic Ocean, to its terminus at La Boca (the harbor terminal), in the Bay of Panama on the Pacific. From this point a channel has been dredged in the bay out to deep-sea

water in the Pacific, near the Naos Islands. This channel measures three miles in length, making the total length of the canal about 46 miles. Of this length, 57 per cent (about 26 miles) is in tangents, and about 20 miles in curves. The minimum normal radius of the curves is 9,900 feet; in some few special places it is 8,250 feet. It is perhaps proper to add that the greater the radii the longer the curves, and in consequence the greater the safety and the easier the navigation and use of the canal. In this respect the Panama is superior to some of the existing canals and compares favorably with any in existence or projected.

The divide between the two oceans is situate at a point 34 miles distant from Colon. The length of the summit level is 6.5 miles between the Obispo locks and the Paraiso locks. There are four locks on each slope, placed generally in pairs. There are to be six levels, including the two tidal levels near the oceans. The locks are distributed as follows:

First, on the Atlantic slope: A set of two locks, one above the other, at Bohio, at about 14.5 miles from Colon, and another like set at Obispo, 28.5 miles from Colon.

Second, on the Pacific slope: A single lock at Paraiso, at 35 miles from Colon; a set of two locks, one above the other, at Pedro-Miguel, 37 miles from Colon, and a single lock at Miraflores, about 38.5 miles from Colon. The bottom of the canal, in the summit level, is at an elevation of 68.1 feet above the mean sea level and the maximum lift of the locks is 29.5 feet. Under extraordinary circumstances, and only for a short time, the lift of the Bohio locks may reach 32.8 feet. The plans proposed for the different levels are substantially as follows:

TIDAL LEVEL ADJOINING THE ATLANTIC.

Total length	miles..	14.8
Width at bottom, according to the nature of the soil	feet..	98 and 111
Minimum depth of water	do.....	29.5

On this length of 14.8 miles two enlargements have been provided to allow vessels to pass one another. These enlargements will measure 1,970 feet in length and 197 feet in clear width, not including the parts connecting them with the normal section of the canal. This level has been nearly completed by the old company and at the present time it is navigable nearly its entire length. It has been made 72 feet wide at the bottom (which was the width originally adopted for the Suez Canal) and this will be sufficient for the opening of the canal to navigation. The prism of the canal will afterwards be dredged to the required width of at least 92.5 feet. The volume or cubic contents of materials to be removed to complete this first level, as indicated above, is 8,340,000 cubic yards.

BETWEEN THE BOHIO LOCKS AND THE OBISPO LOCKS.

The entire length of this level, about 14 miles, runs through the artificial Bohio Lake, formed by the Bohio dam. It will be simply a navigable channel through this lake. Its proposed dimensions are:

	Feet.
Minimum width at bottom	164
Minimum depth of water	29.50
Maximum depth of water	42.6
(According to the stage of water in the lake.)	

This channel will be carefully marked or buoyed, and vessels will easily pass one another in the whole distance. A great part of the excavating has been done by the old company, and there remains to be excavated only 10,940,000 cubic yards.

THE SUMMIT OR DIVIDING LEVEL

This level, about 7 miles in length, lies between the Obispo locks and the Paraiso lock. Its proposed width at the bottom is 118 feet, depth of water varying between 29.5 feet and 36 feet. It includes the Great Cut through the dividing ridge, and is the most important earthwork of the whole enterprise. The total amount of material yet to be removed is 31,250,000 cubic yards, and is divided into two nearly equal parts, the section called "Emperador" and the one called "Culebra." The principal part of this work simply consists of enlarging the work already done.

THE LEVEL LOCATED BETWEEN PARAISO LOCK AND THE PEDROMIGUEL LOCKS.

This level, about 1.5 miles long, has a width at the bottom of from 98 to 111 feet, according to the nature of the soil. The minimum depth of water will be 29.5 feet. The total amount of materials to be removed is only 1,900,000 cubic yards.

THE LEVEL LOCATED BETWEEN THE PEDRO-MIGUEL LOCKS AND THE MIRAFLORES LOCK.

This level, 1.5 miles long, will have the same dimensions as the preceding one. The amount of materials to be removed being 1,450,000 cubic yards.

THE TIDAL LEVEL ADJOINING THE PACIFIC.

This level, 4 miles in length, will be located between the Miraflores Lock and the harbor of La Boca, and by means of a channel 3 miles in length will extend to deep water in the Pacific. It will measure at the bottom 98.5 feet in width from the lock to La Boca, and 164 feet in the Maritime Channel, with very easy side slopes.

Vessels will be able easily to pass one another in the whole length. The depth of water will be 29.5 feet at extreme low tide and 49.2 feet at extreme high tide. The total amount of materials to be removed is 12,600,000 cubic yards, most of which will be done by dredging.

Below and above all the locks, or series of stepped locks, basins will be located to allow the vessels to wait their turn. These basins will measure 2,300 feet in length and 213 feet in width at the bottom. The necessary excavations for the basins have been included in the amounts of material to be removed, as given above, for each separate level.

To sum up, the grand total cubic contents of materials to be removed to complete the canal is 66,500,000 cubic yards.

LOCKS.

The locks, as proposed, will be built of concrete, but the parts which may be exposed to shocks from vessels will be built of dressed granite. They will have two lock chambers, one 82 feet and the other 59 feet in width. The working length of each chamber will be 738 feet. The depth of water will be 31.15 feet at the side walls and 32.8 in the center of the chamber. There will be intermediate gates in the smaller lock

chamber. To fill and to empty the lock chambers, there will be two large iron pipes built in the floor, running along the whole length of the chambers, and perforated. This operation will be done very quickly without any inconvenience to vessels. The sizes of these locks are as great as those of any other locks built up to the present time on maritime canals.

All the proposed mechanical appliances to operate the gates, to light the locks, to moor the vessels, as well as to facilitate their passage through the locks, are of the most approved design, and only those appliances are employed which have given the most satisfactory results in actual experience.

All the proposed locks will be built on rock foundation. They are located at points which had already been selected by the old company when it was found necessary by its officials to substitute a lock canal for a sea-level canal. The ground was broken and the excavations for foundations made, and now the new company has only to enlarge what was then done. Therefore all the data necessary as to the nature of the soil are known from what has already been done. Moreover, borings have been made wherever these enlargements of the foundations are required and they have given full knowledge of the materials to be removed.

These locks as designed are able to accommodate a very large traffic. The computations, based upon practical experience obtained on other great modern maritime canals, show that the passage through one lock by one or more vessels will not require more than forty-five minutes, including the entrance to and exit from the lock, so that there might be 32 passages in twenty-four hours for each lock chamber, but in practice, allowing for lost time by unavoidable delays, we can only figure on 24 passages as an average. In figuring on a net registered tonnage of 2,000 per passage we might accommodate (with only one lock chamber) a traffic of 48,000 tons per day, making a total net registered tonnage of more than 15,000,000 tons for three hundred and twenty days of actual navigation; but owing to the fluctuation of the traffic and its irregularity at certain periods of the year it is not possible to employ a theoretical average from the basis given above, so that in order to keep within practical limits we estimate only about 10,000,000 tons, as found above, as the capacity of the locks for each lock chamber, and, of course, twice this amount for the two lock chambers. It may be easily seen that the commercial capacity of the canal is indeed very great, much beyond any estimates that have been made.

FEEDING THE CANAL.

There is one more problem to solve, and that is the feeding of the canal. Careful computations have been made from data at hand and based upon experience, which show that to supply the water necessary for the working of the locks, assuming a daily average of 24 passages through them, and to make up for all accidental or natural losses, it is necessary to supply to the summit level, and by it to the other levels, a regular volume of 702 cubic feet per second. To this end the new company has planned the construction of a feeder beginning at the Alhajuela Dam and ending at the summit level, running on the left slope of the valley of the Chagres River. This feeder takes its water from the large storage reservoir formed by the Alhajuela dam and is designed so as to have at that point a flow of 891 cubic feet per second, and if deemed necessary this flow can be easily increased afterwards to 1,215 or 1,350 cubic feet per second. This feeder has a length of 9.9 miles.

Several members of the international technical commission and myself carefully examined the region, and then observations, as well as preliminary and location surveys, were carefully made over the whole region through which this feeder is to pass. Its construction does not present any difficult problem or any feature which is not met every day in engineering practice. The part of the work which will be the most expensive is at a point where the feeder crosses the Chilibre River, and on its left bank. To cross this great depression we propose to build an inverted siphon 4,590 feet, and formed of three steel pipes, each having a diameter of 7.9 feet, to be laid side by side in a casing closed and covered.

Another siphon of the same description, and 2,000 feet long, is proposed to cross another valley not far from the first one.

During eight months of the year the flow of the Chagres River is much greater than is necessary for feeding the canal. During this time the feeder will, of course, be supplied with even more than is needed by the regular contribution of the river in the Alhajuela Lake, where it begins. But during three months in the dry season, from January 15 until April 15, the mean flow of the Chagres River falls to 594 cubic feet per second. It is, then, necessary to keep a storage in this lake before the dry season begins, to make up for the falling off of the flow of the river. This falling off or loss during the whole time in question is about 864,000,000 cubic feet. For feeding the canal and generating the motive power necessary to work it a storage capacity of 4,644,000,000 cubic feet has been provided by the plans, and this capacity is independent of another storage of 3,537,000,000 cubic feet obtained by retaining a part of the flood water. So that there is no possible doubt that all the needs of the canal have been amply provided for.

The storage capacity necessary to supply all the needs of the canal during the dry season was designed so as to be more than sufficient, even under the most unfavorable conditions. Nevertheless, if it should be advisable to have a still greater margin of safety by increasing the storage capacity, this can be easily and cheaply done by raising the Alhajuela Dam 10 feet above its proposed height. This will increase the storage capacity by 2,835,000,000 cubic feet. The Alhajuela works, as well as the construction of the feeder, will have to be carried on in a region where there are no roads and where transportation facilities are lacking. To provide transportation for the men and for the materials a railroad is proposed connecting the Panama Railroad to Alhajuela. Careful surveys have been made to locate this road, 10 miles long, the construction of which is an easy matter.

A PROPOSITION SHOWING THE POSSIBILITY OF LOWERING THE SUMMIT LEVEL.

In the plans which have been presented above the elevation of the summit level was 68 feet above sea level. This elevation has been decided upon in order to lessen the amount of excavation to be done at Culebra cut, and to do it within the specified time, viz, eight to ten years; but if the work could be done more rapidly than has been estimated the elevation of the summit level could be lowered about 35 feet. This would permit of doing away with the stepped Obispo locks and the single Paraiso lock. In this case the Bohio Lake itself would become the summit level and would be fed directly from the Alhajuela dam through the natural channel of the Chagres, and the feeder would be unnecessary. But the Alhajuela dam should be built, as it has been proposed, in order to regulate the Chagres River and to store the water

necessary to generate motive power and to operate the canal during the dry season. The cost of the work would not be much increased by these alterations, but it would take from three to four years to remove the additional 11,000,000 cubic yards of material.

The estimated cost of the work to be done on the canal before its completion is \$100,000,000, of which \$17,000,000 are for contingencies.

The several estimates for each class of work were based chiefly on data obtained by actual work executed by the new company, and it is almost certain that the prices and cost will be less than the estimates, owing to more favorable circumstances or improved methods. By a thorough system of control and supervision all the observations, surveys, computations, and figures have been checked, and I am now certain that the plans proposed by the new company are feasible and practicable.

CONDITIONS WHICH WILL MATERIALLY HELP THE NEW COMPANY TO RAPIDLY FINISH THE PANAMA CANAL.

The new Panama Canal Company has a great advantage over any other enterprise to successfully and rapidly open a maritime canal between the two oceans. This advantage lies in the complete state of preparation which existed when this company began its works, as well as in the important amount of work which had already been done.

In such a great undertaking there are always preliminary works to be done which take a great deal of time and cost large sums of money. In wild or unsettled countries roads and railways must be built to insure transportation; houses must be erected for the accommodation of large forces of men; workshops for repairing the plant, as well as general stores to supply all the necessities of life; yards must be laid out, including a complete railroad system; and, finally, hospitals must be built to insure the necessary medical service and care that may be needed by a large force of men working in a tropical region. All this of course has to be done on a large scale and takes time. All this has been provided already on the Panama Canal and would have to be created anywhere else.

The new company now has an organized system in force on several points of the line, where work is being carried on. It would take but a few months to have the entire enterprise in good working order.

An independent railroad, the Panama Railroad, crosses the Isthmus and runs along the canal. Immense storehouses and workshops are located at the most important centers. All these buildings are in very good condition and could be quickly put into use for a large force.

About 2,000 dwelling houses are distributed along the canal wherever it is necessary; they are well built and in good condition. There is a large hospital at Panama, including 16 separate pavilions very well fitted out, and having 334 beds with sufficient space for a total of 500 patients. There is another hospital, somewhat smaller, at Colon. These hospitals are well kept, and are managed by Sisters of Charity.

The working plant includes a dozen powerful dredges, some 50 excavators, about 100 standard-gauge large locomotives, more than 1,200 large cars and a great number of narrow-gauge dump cars, hoists of all descriptions, and material for track repairs and maintenance of way for standard and narrow-gauge tracks. All this was left by the old company; it has been stored, inspected, and kept in good condition, and part of it is now used by the new company. This plant is quite sufficient to complete the works on the canal. A few excavators are some-

what out of date and should be replaced by new ones of a more recent pattern.

All this gives a great advantage to the Panama Canal enterprise, and will certainly facilitate and hasten its completion before any other rival undertaking, the Nicaragua, for instance, the route of which has not even been decided upon as yet.

The other advantage in favor of the Panama is the great amount of work which has already been done either by the old company or by the new. The canal is not a work to be undertaken, but simply a work to be finished.

The total amount of materials yet to be removed is 65,500,000 cubic yards.

The old company and the new have already removed 46,000,000 cubic yards. This would be about two-fifths of the whole amount to be excavated if actual work on the canal had not been started.

As to the cost of what remains to be done, we must not estimate it on the unit price paid by the old company, because this price is, for many reasons, much greater than the unit price now being paid for work and which must be paid in the future.

It is estimated that it will take eight to ten years to complete the canal. That is a very conservative estimate, and, taking into consideration the advantages above mentioned, there can be no doubt that, other things being equal, the Panama Canal is the canal that will first connect the Atlantic with the Pacific.

L. CHORON.

Subscribed and sworn to before me this 25th day of January, 1899.

[SEAL.]

JOHN J. TIERNEY,
Notary Public, Kings County.

(Certificate filed in New York County.)

P. S.—My attention has been called to a statement made by one of the witnesses who appeared before the committee on the hearing of the Maritime Canal Company, to the effect that it would cost \$400,000,000 to complete the Panama Canal. As this gentleman and the unknown engineers to whom he referred had not seen the report of the international technical commission, or at least were not familiar with the specifications and detailed plans of the company, it is not necessary to do more than to characterize the statement as of no value and, of course, untrue.

L. CH.

**STATEMENT, UNDER OATH, BY MR. A. FTELEY, A MEMBER OF
THE INTERNATIONAL TECHNICAL COMMISSION OF THE NEW
PANAMA CANAL COMPANY.**

NEW YORK, *January 25, 1899.*

*To the honorable the members of the Committee on Interstate and Foreign
Commerce of the House of Representatives.*

GENTLEMEN: The undersigned respectfully submits the following, a brief statement in regard to feasibility of the Panama Canal, confining himself to such subjects as appear to be most important from an engineering standpoint:

Having been requested by the representatives of the New Panama Canal Company to state his previous occupations and experience, he

begs to state that he has practiced as a civil engineer for nearly forty years, thirty-three in the United States; that, although engaged in various branches of the profession, he has especially devoted his time to hydraulic engineering, having been engaged in building aqueducts, dams and reservoirs, tunnels, siphons, sewers, and various other structures involving large and deep excavations and very extensive masonry, and in consulting with others on the design and construction of the same, especially in the cities of New York and Boston; also in Brooklyn, N. Y., Newark, N. J., Rochester, N. Y., Washington, Cincinnati, and various other cities and towns.

He was president of the American Society of Civil Engineers in 1898, and is now mainly engaged as chief engineer of the aqueduct commissioners of New York.

In April, 1898, he was appointed as a member of the international technical commission of the New Panama Canal Company, and since then has been in continuous correspondence with them and obtained knowledge of numerous plans, maps, drawings, and calculations of the various sorts prepared by their engineers. He also conferred with the director-general of the company during his stay in New York and met in Paris with the other members of the engineering commission in September, 1898. It was during the meetings then held that the main questions discussed in their report were decided on.

The undersigned did not visit the Isthmus, and the opinions herein expressed are based on the information obtained from the very complete surveys, maps, plans, and other documentary evidence furnished by the company; also on the verbal statements of its officers and of the members of the engineering commission who visited the Isthmus.

From the inception of the work on the Isthmus of Panama it has been recognized that the treatment of the River Chagres was one of the most, if not the most, important question involved in the proposed plan. The canal was to be protected from its floods and at the same time it had to be fed at all times of the year from the Chagres, while it is known that during the dry season the flow therefrom is not sufficient to meet the demands of navigation through the locks.

The first step in this study consisted in procuring the necessary data for an estimate of the flow of the Chagres at all times of the year. The records of rainfall and of river flow kept by the Panama Railroad Company are in that respect of great value but are much surpassed in completeness and accuracy by the records kept by the former Panama Canal Company, and much more so by the continuous returns furnished by the observations of the new company.

All these records of rainfall and of river flow have been compiled and so thoroughly analyzed as to leave no doubt as to reliability of the conclusions arrived at. On the other hand, the amount of water necessary to supply the canal up to the requirements of navigation, taking into account all the losses expected from evaporation, absorption, and leakage through the gates and otherwise, was computed from the experience of known precedents.

Having thus established the minimum amount of water to be relied upon from the minimum flow of the river, and the volume continuously needed for the proper working of the canal, it remained to so accumulate water during the time of the higher flow of the Chagres as to provide for the dry season.

The desired result has been accomplished by the formation of large reservoirs or artificial lakes, which are sufficiently capacious for the storage of the necessary water supply.

These lakes have another function; they are intended to serve as regulators for the floods of the Chagres, which are to be wholly or partly retained and controlled.

The capacities of these artificial lakes are given in full in the report of the engineering commission, and need not be repeated here; but it may be stated that they are ample to cover all the necessities of navigation and to provide for the regulation of the floods, considering the most extreme cases which have been known to occur on the Isthmus. If it were found advisable to anticipate larger floods or smaller flows than any that have occurred for fifty years, a much larger margin of storage could be procured by raising the upper dam a few feet at a comparatively small expense.

It has been shown to the committee that the necessary storage is to be secured by the construction of two dams, one on the Upper Chagres, at Alhajuella, and another on the line of the canal at Bohio.

The Alhajuella dam has been shown to be designed as a structure of concrete masonry. Its foundations are to be on solid rock, fully located by borings, and does not present any feature that is not justified by precedents. Higher structures have been built, and its section is sufficient to resist the pressure to be put upon it. A number of high dams of this character have been built in this country and in Europe, and New York is now erecting, in connection with its water system, a dam which, measured from rock foundation to crest, is nearly double in height, and the storage reservoir to be formed by it is of about the same capacity. The construction of Alhajuella dam is absolutely justified by engineering experience.

The lower dam at Bohio is to be of earth with a central core wall. It is to be built on a foundation of impervious clayey strata in thin layers, well compacted, and the plan devised by the engineers of the company to protect the work from the incursions of the river is well devised. If a large flood occurred while the work is in its lowest stages, a loss of time might occur, but the parts already built would not be endangered. The section of the dam is ample for the strains that it would have to resist, and is more than justified by precedents. Much higher earth dams have been built in various parts of the world, and in the United States a number of such instances may be found, especially in California and Arizona.

The treatment of the floods of the Chagres during construction is no novel undertaking. Dams have been built on much larger streams which flow all the time as much or more water than the Chagres when it is in flood; the latter consequently presenting the advantage of long periods during which work can be performed with comparative ease, and during which facilities are given to make preparations for the times of high water.

The artificial lakes to be created are large, but their area has no relation to the strains that the dams would have to resist, and there can be no question that the latter are so designed as to fully render the service expected of them. Such being the case, the control of the river is assured, with the aid of the spillways connected with the dams. These spillways are to be so provided with proper machinery as to regulate the overflow and to keep the fluctuations of the lakes within predetermined limits.

The channel which conveys the water necessary for the feeding of the canal starts from the reservoir formed by the Alhajuella dam and runs in a direction approximately parallel with the river until it reaches the summit level of the canal. The sidehills being very irregular, it has

not been found advisable to adopt a single form for that structure, which has been so designed as to adapt it to the formation of the ground. At points the water flows in an open channel; at others spurs are crossed by tunnels; at the crossing of deep valleys steel siphons are resorted to, and when the valleys are of less depth small lakes are to be formed by damming up the streams. The sections of the various channels are so calculated as to be amply sufficient to convey the water necessary to feed the canal; and although the rugged character of the ground has led to frequent changes of form in the channel, there is nothing in the proposed structure that is not amply justified by engineering experience.

Much uneasiness was felt when the New Panama Canal Company began operations in regard to the difficulties to be experienced in excavating the deep trenches at Emperador and Culebra. This feeling was to a certain extent justified by the character of the materials found in the excavation near the surface; slides had occurred, and it was feared that if it remained the same farther down the difficulty in reaching the lower strata would become very great. Further excavations were ordered, test bits and shafts were sunk, and it has been conclusively demonstrated, from the information thus obtained from years of labor upon this section of the work and from careful observations made, that the softer earth originally found does not extend below the upper strata first removed; that, on the contrary, a hard and compact material is encountered, which has been shown to resist the weather and to maintain its slopes well; that the excavation can be safely undertaken, and that the former objections to the canal on those grounds have been entirely eliminated.

The figures adopted for the cost of the various kinds of work to be performed for the construction of the canal and of its appurtenances are established from the known cost of labor and materials on the Isthmus and from the construction accounts of the company.

The work done for the last four years has been performed by the same class of laborers who are expected to be engaged on the work when it is being performed on a larger scale, and the present cost of the excavation appears to be a safe basis of computation.

A comparison with the units of prices usual in the United States confirms, also, the belief that those adopted are conservative, reasonable, and sufficient. It is on the unit prices thus established that the estimates of cost shown in the report of the engineering commission have been made; they include, besides, a margin to cover contingencies.

Without going into more details as to other parts of the proposed work which have not been mentioned herein, it may be stated that the canal, including all its appurtenances, is feasible; that the plans do not contain any feature that is not justified by engineering experience, and that, with good management, the work proper can be completed for the sum and within the time named in the report of the engineering commission.

The work of the new company has been judiciously done. Its officers, knowing how much their predecessors had been handicapped by lack of preparation, have done all that was necessary to ascertain beyond question all the conditions under which operations would have to be conducted.

The actual excavation made, although a part of the final one, was so directed as to disclose all the information which was necessary for the proper understanding of the work to come; borings were made and established the fact that all the locks and the Alhajuela Dam can be

built on solid rock, and other preparatory work of various descriptions was performed.

Complete surveys were made, plans and maps furnished, and the drawings of the structures were studied in a complete manner. Owing to this accurate work the quantities used in formulating the estimates have been obtained from schedules giving the detailed quantities of all parts of the work.

The engineering work, including all the necessary topographical details, has been so exhaustive that, barring the details of construction, everything is ready for an immediate prosecution of the work on a large and final scale.

The Panama Railroad and the many buildings already provided for the convenience of the work and of the men engaged therein would obviously be of great value to shorten the time which would otherwise be necessary for preliminary preparations.

P. FTELEY.

Subscribed and sworn to before me this 25th day of January, 1899.

[SEAL.]

EDWARD T. McLAUGHLIN, JR.,
Notary Public No. 21, New York County, New York.

APPENDIX.

REPORT TO THE NEW PANAMA CANAL COMPANY BY THE INTERNATIONAL ENGINEERING COMMISSION, APPOINTED IN ACCORDANCE WITH ARTICLE 31 OF THE BY-LAWS—DATED NOVEMBER 16, 1898.

INTRODUCTION.

In accordance with article 31 of the by-laws, the New Panama Canal Company appointed an engineering commission composed as follows:

Messrs. Robaglia, president, general inspector of the ponts et chaussées (retired); Bouvier,* secretary, general inspector of the ponts et chaussées (retired); General Abbot, Engineer Corps, U. S. A. (retired); Castel, general inspector of mines (retired); Daymard, chief engineer of Transatlantic Company; Fargue, general inspector of the ponts et chaussées (retired); A. Fteley, chief engineer, aqueduct commission, New York; Fulscher, private counselor to the department of public works of Prussia, formerly technical director of the Kiel Canal; Hersent, civil engineer; Hunter, chief engineer of the Manchester Canal Company; Koch, counselor of public works, director of the Technical Academy of Darmstadt, formerly special member of the imperial commission of the Kiel Canal; Jules Martin, general inspector of the ponts et chaussées (retired); Skalkowski, formerly director of the bureau of mines in the department of agriculture and estates, Russia; Sosa,* chief engineer of the Republic of Colombia.

The commission held, from February 3, 1896, to September 8, 1898, ninety-seven regular sessions and many informal meetings. They followed, as it were, day by day, the surveys, the works, and the plans of the company. Several members went to the isthmus in the spring of 1898. They brought back valuable data and information which confirmed in all points the conclusions which the commission had already drawn from their studies in Paris. In this way they succeeded in establishing with precision the basis and the general plan of a study of a canal with locks, the execution of which will fully provide for the interests of commercial navigation between the two oceans, and will present practical conditions as regards the expense involved and the time necessary for construction.

The details of the plan will be given further on, but it seems at first to be interesting and necessary to indicate what might be called the genesis of the ideas, which,

*The commission mourns the loss of Mr. Sosa, drowned in the sinking of *La Bourgogne*, and of Mr. Bouvier.

by a progressive evolution resulting from the teachings of the past and the deductions drawn from actual experience, have brought out the solution considered by the engineering commission as the most logical and satisfactory. This will be the subject of the first chapter, the aim of which is to show the varied aspects of an extremely complicated problem and to justify the solution arrived at.

CHAPTER 1.

DISCUSSION OF A POSSIBLE SOLUTION AND JUSTIFICATION OF THE ADOPTED SOLUTION.

PRINCIPAL PROBLEMS TO SOLVE.

The building of a maritime canal across the Isthmus of Panama, to unite the two oceans which bound the American continent, encounters, from a technical point of view, two main difficulties; they are, on the one hand, the chain of the Cordilleras, which must be crossed by a cut about 110 meters (360.9 feet) deep if a level canal is under consideration, and little less than 70 meters (229.66 feet) deep (a depth very great yet) if a canal with locks is intended; on the other hand, there is the River Chagres, a torrential stream, subject to sudden freshets, of which the canal must necessarily follow the valley for a great portion of its length, and against which the works must be protected by means of a proper regulation of its flow in order to insure the safety of navigation.

A third difficulty of a general order appears when a canal with locks is considered; the question of feeding the canal assumes, on account of the vastness of the several needs to be provided for, an importance well indicated by the fact that the accumulated flow of the Chagres itself and of other streams met with on the line of the canal become insufficient during a certain portion of the year.

The first two difficulties increase with the supposition of a lower level of the canal, and acquire their maximum of intensity in case of a canal without locks.

On the contrary, the third difficulty, which appears only with the hypothesis of a canal with locks, becomes greater as the summit level of the canal is higher up.

The first question, the one relating to the excavation of the great cut at the summit separating the two watersheds, does not raise any special technical question. It is simply work to be done by manual labor, which may require more or less time and expenditure, but which, being without inherent element of impossibility on account of the well-known character of the materials, does not require any special study. It is a practical problem of a large excavation to be made within a restricted space.

Principal difficulty encountered in the building of a canal without locks.—The second difficulty, due to the presence of the River Chagres upon the same ground as the canal, is of a more serious order, in view of possible consequences.

The regulation of the bed of the river for the purpose of utilizing its bed for the location of the canal can not be thought of. The irregularity of its flow and the violence of its large freshets are incompatible with a solution of that kind. To turn it completely from its actual course and throw it back on the Pacific slope, far from the location selected for the canal, an idea formerly brought forward and partly considered, would be a colossal undertaking, requiring an amount of labor which would render it impracticable. It is a solution upon which it does not seem possible to dwell. Therefore it becomes necessary to make of the river and of the canal two good neighbors whose character and wants are to be harmonized. This is a question which seems very difficult when considering a canal without locks. In fact, from whatever point of view it is considered we must acknowledge that in such a case it is necessary to locate, in a parallel direction with the canal, an artificial waterway capable of taking care, under occasional conditions of flood, of a very large flow per second, even in the case when the waters of a large portion of the watershed would have been temporarily stored in the reservoir to be provided.

An artificial bed established at a higher elevation than the canal would, in order to provide so large an overflow, prove to be not only a work very difficult to carry through materially, but a danger, a permanent menace, for the canal itself.

We can consequently state that the principal obstacle to the execution of a canal without locks proceeds less from the difficulties entailed by the execution of the big cut at the summit than those which spring from the proximity of the Chagres in the region to be crossed before reaching that summit. There lies an obstacle insurmountable to a conception of that kind.

Rapid glance at the plans of the old company.—It is, nevertheless, this plan which the old "Compagnie du Canal Interoceanique de Panama" adopted and tried to carry out almost to the last days of its existence, under the irrepressible pressure, we must

say, of the man in whom the scheme was impersonated. All know to what degree they had carried out his plans. The great cut at the summit was, as it were, only attempted. Out of a depth of 110 meters (360.9 feet) on the center line at the culminating point of the gap only 20 (65.62 feet) were finished. As to the question of the regulation of the Chagres, we may say that, if the old company saw and weighed the difficulties of it, they had not given a real solution of them. The dam they had proposed on the so much discussed location of Gamboa to store up temporarily a portion of the Chagres freshets was never begun. As to the derivation channel provided below, alongside of the canal, to take care of whatever water the reservoirs could not accommodate, we have good reason to state that these channels were far from answering their purpose. In fact, this important question remained yet to be solved when the irresistible pressure of events obliged the company to modify their plans and abandon, for a time only, as they supposed, a canal without locks and substitute for it a canal with locks.

To the two great difficulties due to the building of a canal without locks was then added the third one relating to the feeding of a canal with locks.

Circumstances allowed the company no time for long reflection or for varied or protracted study of the question under the new conditions. They had, as it were, and without delay, to improvise and execute.

Concerning the execution of the big cut, the company took the means which were evidently the wisest under the circumstances, that of reducing it to a minimum by establishing the upper level as high as possible, but within limits plainly acceptable; they fixed the elevation of its bottom at 40 meters (131.23 feet) above mean sea level, which change would diminish by 50 meters (164.04 feet) the depth of the cut required for a canal without locks.

They proposed 5 single locks on each slope, each 18 meters (59.06 feet) wide and of a useful length of 180 meters (590.56 feet), with a fall of 11 meters (36.09 feet).

The feeding question was solved in a manner suggesting the idea that such a canal with locks was considered only a temporary one; such feeding was to be done by machinery taking the water from a reservoir to be formed by the building of the Gamboa dam reduced to a size much smaller than in the case of a canal without locks.

As to the question of the disposition of the Chagres, it is likely that a study of its solution had been postponed.

It would be out of place to criticise here the plans of a canal with locks as prepared by the old company, and which, under the pressure of events, was merely started.

The preceding brief sketch concerning past facts has no other object than to emphasize this point, namely, that the conception of the old company furnished no solution in any way satisfactory to the three fundamental questions which spring up when the building of a canal with locks across the Isthmus of Panama is considered. We can only learn from the unfortunate past that material proof has been furnished that a canal without locks to unite the two oceans is an undertaking the realization of which can not be thought of certainly for a long time to come.

Schemes of the "commission d'études."—After the failure of the old company, the receiver, being anxious that the rights acquired from the "concession" be not forfeited, which would have caused the loss of the benefits of the great efforts already made and of the important results obtained, conceived the idea of undertaking anew, on a different basis, the interrupted work, and of carrying it through. He named a "commission d'études," under the presidency of Mr. Guillemain, general inspector of the "Ponts et Chaussées," whose mission it was to study the status of the undertaking and, if possible, to establish the basis for a new plan capable of being executed within reasonable limits of time and expense. The commission d'études at the start put aside the idea of a canal without locks, impracticable under all the conditions they had to consider, and condemned the plans of a canal with locks as adopted by the old company, which appeared to them to present capital objections, and formulated the programme of a scheme established upon an entirely different basis, in which scheme are stated and discussed with great authority the solution of the three great questions raised by the construction of a canal with locks across the Isthmus.

The first endeavor of the commission d'études was to study a plan that would be feasible within the limits of time still left before forfeiture, which was about nine years, out of which one year would be required for the resumption of the work. The commission d'études admitted in principle that the work requiring the longest time would be the excavation of the cut in the central mass at La Culebra, and that this was the limit of time required for the completion of the canal.

The answer to the first of the three main questions was then reduced to the more precise and limited one: What depth can we hope to reach at the Culebra cut in the eighth year of actual work? The answer would furnish an inferior limit below

which, everything considered, they could not think of going, and that limit, they thought, was to be established at elevation 25.50 (83.66 feet). Moreover, the solution they thought most satisfactory for the problem of the feeding of the canal allowed them to establish definitely the proper elevation for the summit level.

They put aside the suggestion of mechanical feeding which presented too much uncertainty and no elasticity to face the complicated and variable needs of a great maritime canal. They likewise rejected at once the feeding through a channel that would have to be built in the upper valley of the Chagres, a region "practically unknown," they said, "and crossed by numerous high-banked streams."

The only means left was, therefore, the direct utilization of the Chagres itself as a feeder; by means of a dam to be built across its banks at one end of the summit level, its surface would be raised to the very elevation of the canal at that point. They condemned the location of the Gamboa dam, adopted by the old company, which appeared to them "one of the least convenient that could have been selected," and recommended the location of San Pablo, P. K. 38 of the canal line. At that point they would close the Chagres Valley and a secondary depression; then, incorporating with the dam a set of two locks, they would thus form a thorough inclosure which would determine a large lake of which the summit level of the canal would be an integral part; that summit level on the Pacific side would end at Paraiso (P. K. 67 of the canal) with a set of two locks and an adjacent convex dam closing the Rio Grande Valley.

The location which they recommended for the large dam at San Pablo did not, however, leave them without doubts as to the security it offered; they pointed it out only with reserve, stating that, at all events, it was necessary to show prudence in the determination of the height of the dam so directly connected with the elevation of the summit level, since that elevation would be that of the lake thus formed. These prudent considerations finally led them to adopt definitely elevation 25.50 (83.66 feet), the extreme limit admitted on the basis of time necessary for completing the excavation.

Thus are at once closely bound and solved the two important questions of the depth of the central cut and of the feeding of the canal.

The third question, probably the most difficult one, that of mastering the freshets of the Chagres, is, in the Commission d'Etudes' opinion, largely being solved at the same time. The lake formed by the San Pablo dam becomes, in fact, a regulating reservoir in which the Chagres freshets can spread out while losing the greater part of their velocity, and can possibly be, in a measure, temporarily retained in order to limit the overflows to the low grounds through each end of the dividing summit level.

Allowing a rise of 2 meters (6.56 feet) in the San Pablo Lake, the commission d'études believe they can store 60,000,000 cubic meters (2,119,000,000 cubic feet) at the time of the greatest freshets, and have to let pass through the summit level a maximum flow of only 1,200 cubic meters (42,380 cubic feet) per second—900 cubic meters (31,780 cubic feet) toward the Atlantic and 300 cubic meters (10,600 cubic feet) toward the Pacific. In order to allow the overflow of 900 cubic meters (31,780 cubic feet) per second on the Atlantic side without endangering either the canal or navigation, the commission d'études indicates, below the San Pablo Lake, the possibility of a second lake, formed by building across the Chagres Valley at Bohio a second dam, accompanied with a cluster of two locks. This lake would constitute the second level of the canal on the Atlantic side, and is not intended as a storage reservoir. The waters fed from San Pablo would flow to the sea through the artificial channels located by the old company on both sides of the canal, which it would only be necessary to complete as intended, or through the canal itself.

Principal objections to this plan.—On technical grounds the scheme of the commission d'études gives rise to serious objections, which will be indicated further on, but it has the advantage of establishing two apparently very rational principles for the solution of the two more important questions raised by the building of a canal with locks.

The first one, relating to the depth of the great cut, is that there is no cause for magnifying the fear that the geological formation may compel the establishment of too high an elevation; that it is possible, without running any chances, to assume a much lower elevation, fixing for it a limit more in accordance with the time allowed for the excavation.

The second principle is that the solution of the question of management of the Chagres must be looked for in the establishment of reservoirs or artificial lakes outside or on the very line of the canal—lakes in which a portion of the freshets would be temporarily retained, while the remainder would flow without creating danger or even impediments to navigation.

In fact, these two principles are to dominate all subsequent schemes, being, however, so applied as to eliminate from the plans of the 'commission d'études' the objectionable features, which are mainly as follows:

In the scheme just briefly analyzed, the two questions of the lowering of the cut and of the feeding are closely bound in such a way that what favors the solution of the one is harmful to the other. It is, in fact, necessary with that combination to deepen the cut as much as possible, thus increasing the difficulties of the work in order to facilitate as much as possible the construction of the constituting structures for the adopted system of feeding, and vice versa. This is the consequence of excluding at the outset a mode of feeding based upon the construction of a source of supply in the higher valley of the Chagres, and of a feeding channel, a method which would prove elastic as far as the elevation of the summit level is concerned. This first objection is serious.

A second one, still more serious, bears upon the selection of the location of the dam which is to be the very key to the solution, a location upon which the commission has been reserved, however, stating on that subject that new surveys were necessary to finally ascertain the formation to be encountered. Now, these new surveys have shown that at that point the formation is very unfavorable to the building of a relatively large dam, and that no satisfactory location can be found along the canal from the point where the Chagres first meets it (P. K. 45) to Bohio (P. K. 24). The commission d'études' scheme, by this fact, becomes impossible of execution, or could only be prosecuted under doubtful conditions of success and of safety, which, they declare themselves, would constitute a capital defect. Even were this dam feasible according to the commission d'études' data, a very grave objection could still be raised concerning the disposal of the Chagres freshets.

The impounding of 60,000,000 cubic meters (2,119,000,000 cubic feet) of water which would be allowed for the excess of the river's freshets, compared with a maximum volume of 1,200 cubic meters (42,380 cubic feet) per second which must pass the dam, is altogether insufficient. The thorough examinations made of the régime of the great freshets of the Chagres, by means of numerous observations, lead to the conclusion that the real excess to be impounded over an allowable maximum flow of 1,200 cubic meters (42,380 cubic feet) through the canal would reach 250,000,000 cubic meters (8,829,000,000 cubic feet); thus we see how inadequate would be the reservoir provided by the Commission d'Etudes.

They indicate, it is true, that if their expectations failed it would only be necessary to let the excess of water escape on the Atlantic side through the overflows of the summit level, even interrupting navigation temporarily if necessary. But this would simply be an experiment which, under certain possible conditions, might prove disastrous to the canal and harmful to navigation.

These several objections constitute, from a professional point of view, motives of sufficient value to warrant the rejection of the scheme of the "commission d'études."

That commission foresaw a duration of eight years of effective work. We here notice that, in a general way, they establish the principle that the excavation of the central cut, everything being considered, is the work requiring the longest delay and is the measure of the time necessary for the completion of the canal.

This opinion may be erroneous, and we are led to believe that it is so with regard to the plans of the commission d'études itself. The aggregate of the masonry work required for the canal with locks may require a longer time than the excavation of the central cut if this last be reduced to relatively restricted proportions. In the special case of the commission d'études' scheme, we are led to think that the complicated group of structures constituting the closing of the valley at San Pablo (locks, dams, overflows, etc.), which the change of location of the Panama Railroad was to precede, at least in part, would have required a longer time than eight years. This, however, is but a secondary objection, because even the foundations of the scheme do not appear to be admissible.

We must, however, retain from the labors of the commission d'études the very principle which form the basis of their plans—principles altogether rational, notably in what concerns the mode of management of the Chagres freshets. These principles, if broadly applied, with the advantage of more precise data and more thorough surveys which the above-mentioned commission had no time to do, can furnish a satisfactory solution of the complicated problem which is before us to-day.

PLAN OF THE NEW COMPANY.

The plans of the "commission d'études" were not carried through. At the request of the receiver, the Government of the State of Colombia agreed to a prolongation of the time stated in the concession for the completion of the canal.

A new company, completely independent of the old one, was formed with a view of finding a practical basis which would allow of the completion of the canal to the best of all possible interests, and of the effective prosecution of the same.

Policy adopted by the new company.—Taking inspiration from their own by-laws, the new company, at the outset, set for themselves as a programme and agreed as a guid-

ing rule to examine and study all the questions which may be raised in the minds of practical and professional men, in order to be enabled to discuss and compare, with perfect knowledge, their advantages as well as their drawbacks.

The committee could not but fully approve the method which, in order to be judiciously applied, requires the complete and accurate knowledge of the topographical and geological formation of the grounds upon which it is proposed to build the work, and also of all the special peculiarities of local conditions which have a bearing on the methods of execution; in short, of all the data relating to the details which are to come into play in the laying out of the plans.

The new company resolved also, in order to justly estimate the amount of material difficulties offered by the execution of the main work, namely, the excavation of the big cut, and in order to dissipate by actual facts the uncertainties which have hovered over all the discussions on that point, to effectively dig the central trench to such an extent that nothing hypothetical would remain as to the characteristics of the final work.

The work so done does not entail any loss, as it is to become an integral part of the final cut.

The fulfillment of this preliminary programme was necessarily to last several years, but the time thus devoted to investigation and experiment is far from being wasted. It is an axiom concerning public works of magnitude that the more the surveys and the preparation of the plans have been long and careful the more the execution is sure and rapid. We may as justly add that the execution of great public works too hurriedly started, without having been preceded by sufficient discussion to allow of finally concluding what is intended to be done and what can be done, leads to great deception and delay when it does not end in disastrous failure, as was the case with the old company. We may even affirm that the primary and principal cause of the nonsuccess and failure of that company was the lack of the necessary preliminary studies.

Principles which were applied in the studies of the several plans.—Simultaneously with the progress of the surveys, with that of the excavations carried on at La Culebra which furnished material data to ascertain the formation of the central mass, the compactness of the materials encountered, and the difficulty of their removal at increasing depths, the engineering force, constantly advised by the engineering commission, laid out several plans of a canal with locks based on different elevations assumed for the canal bottom at the summit level. We were thus led to study in succession a variety of combinations.

The engineering commission, however, considered as principles from which no deviation was allowed in the several schemes and which were restrictive of their scope: (1) At the outset every solution must be rejected which, in itself, and apart from any consideration of time and expense, does not present absolute guaranty of certain success. (2) In preparing the plans of the several structures required by so important and complicated a work, such forms only should be adopted as have proved satisfactory by experience, barring all innovations which might lead to deception. (3) In the examination of all questions, the special conditions under which they are to be applied should be taken into account, as well as the characteristics of the climate, the influence of which may show itself in the inferior quality of labor or the reduced efficiency of the force which directs it. Hence the necessity to plan only simple structures requiring no special conditions in the means of execution.

In every scheme are found, as principal questions to solve, the three fundamental questions which sprang up in all the plans prepared previous to those of the new company, viz: Possible depth of the central cut; mode of feeding the canal; regulating the Chagres freshets.

Possible depth of the central trench.—The question of the possible depth of the central trench, especially in that portion of the principal mass formed by the Culebra, depends on two elements:

(1) The formation of the ground to be excavated, which governs the conditions of stability at various depths.

(2) The material difficulties attending the excavation, from which depend the necessary time and expense.

At first the company, somewhat influenced by the inherited fear of the unsafe formation to be encountered, and following the prudent principles they had set before their minds, thought it necessary to reduce the depth of the cut to a minimum compatible with the execution of a canal offering sufficient facilities to navigation.

A tentative plan elaborated accordingly showed the canal bottom at the summit level to be at elevation 34 (111.55 feet); that plan required five locks of a maximum lift of 10 meters (32.81 feet) on each slope, but the experience of the excavation carried on in the trench showed that the chances of instability were limited to the upper strata, which were to be gone through under all plans, and these fears are now allayed, owing to the actual progress of the work.

The opening with a large force of the trial trench ("cunette preparatoire") and the sinking of many open shafts below the open trench, some even going to elevation 10 (32.81 feet), gave the assurance that the formation below the clayey beds of the upper region present all guaranty of stability, even for steep slopes, down to all possible depths to be considered. The engineering commission, several members of which went to the Isthmus to see things for themselves, thus became convinced that the formation is not to be considered as an element of limitation with regard to the depth to be assumed for the central trench, and that this point was to be determined by considering the time and expense required to reach certain given depths.

Thus, basing their belief upon the experiment undertaken, they formulated the principle that the central trench considered in itself, and solely in the light of the nature of the formation to be encountered, could be made as deep as desired within the limitations necessarily imposed by the possible solution of the other questions, and also by the question of the time to be allowed for completion.

Mode of feeding the canal.—The question of feeding the canal gave rise to the most varied and complete plans. The engineering commission decided that they could not admit the principle of a mechanical supply as a final solution. Whatever precautions would be taken, and independently of the great permanent expense entailed in the operation, such a solution would be too precarious to be allowed for the smooth working of a canal of such a magnitude. Then only two solutions were left as possible, either direct feeding by the Chagres transformed into a lake at some point, which lake itself would constitute the summit level of the canal (this arrangement had been adopted by the commission of 1890), or the feeding through a channel supplied by the Chagres at a point in the upper valley where a reservoir could be formed by the building of a dam, and the flow line of which should be so calculated as to carry the water supply to the summit level at the proper elevation.

Direct feeding by the Chagres.—Concerning the first of these means, it was ascertained by the results of local examinations and investigations that the solution pointed out by the Commission of 1890 could not be applied; that in the whole of the lower Chagres Valley—namely, between Gamboa and the sea—only one location showed favorable conditions for the building of a high dam capable of impounding a lake which would become the summit level.

That location is that of Bohio Soldado (P. K. 24 of the canal line), where the above-named commission had located a secondary reservoir to form the second level of the canal in their plan. The character of the formation met with at that point in the pathway of the Chagres allows of the building of an earth dam of some height, but after carefully studying the geological formation of the underground strata, which was sharply brought forth by numerous test pits, the engineering commission unanimously agreed that it would not be prudent to build on that location a dam forming a reservoir of a depth of more than 20 meters (65.62 feet) above the river bed, which at that point is at about elevation zero above the mean level of the sea.

Considering the importance of that structure as relating to the safety of the canal itself, it was deemed that, on that question especially, it was necessary to be very careful, and consequently the maximum elevation of 20 meters (65.62 feet) was fixed upon as that of the level of the lake to be formed by the building of the Bohio Dam.

Under these conditions, if it is desirable to adopt the Chagres itself as a feeder by utilizing the central lake formed as above stated as the summit level of the canal, the maximum elevation of that level must be 20 meters (65.62 feet) or thereabouts. From this it follows that with a minimum depth of 9 meters (29.53 feet) in the canal, and allowing for a certain variation in its level, due to the variable supply it may receive, the bottom of the summit level, of which the big cut would be a part, must be established in the neighborhood of Elevation 10 (32.81 feet).

Such is the result to which we are led in the question of the direct feeding through the Chagres if we do not wish to deviate, in settling upon the proportions to be given to the main structure of that plan, from the prudent rules which the commission consider as absolute.

The great depth resulting therefrom for the central cut does not seem incompatible with the conditions of stability upon which we may rightly depend, knowing as we do the formation to be encountered; but to-day it does not seem likely that we can execute it within the time that we shall have to fix.

Feeding through a derivation channel from the Chagres.—If we set aside the question of direct feeding, as explained above, we can only consider the feeding of the canal by means of a reservoir to be formed by a dam in the upper valley and of a new channel connecting that reservoir with the summit level of the canal.

On that subject two kinds of plans were carefully examined, both based upon the results furnished by the surveys made in all the upper watershed of the Chagres and upon the study of the country made by several members of the engineering commission.

In one plan the solution would be based upon the building of the dam at Gamboa,

in the immediate vicinity of the summit level of the canal, thus forming a storage reservoir for the feeding of the canal. We know that the old company, while projecting the building of a dam at that place, had in regard to it considerable misgivings, and that the commission of 1890 formally rejected it, saying that "it was one of the most unsatisfactory locations that could be selected." However, on account of the great advantage presented by the Gamboa dam for feeding the canal, it was thought important to study that question upon material data altogether reliable. A complete and very accurate survey of the location was made. Numerous test pits were sunk on the probable line of the dam to ascertain the nature of the ground above rock bottom and the nature and exact depths of the latter. Upon these data several locations were studied as would appear most feasible from a technical point of view. As a result of protracted discussions and of a thorough consideration of the means of construction presented to them, the commission did not feel assured that they would meet in the erection of that structure with any sure chance of success, and, for the future, with the absolute conditions of safety upon which it was imperative that they should rely.

Other grave dangers seemed also to come from a reservoir of such large proportions being located in close proximity to the canal. Consequently, at their meeting of September 6, 1898, they decided that it was imperative to bar any solution based upon the building of a dam at Gamboa. Moreover, contrary to the conclusions of the commission of 1890, which, with hardly any data to guide them, had from the outset rejected the idea of building a dam in the Upper Chagres above Gamboa and a feeding channel between that dam and the summit level of the canal, the engineering commission thought that solution feasible under satisfactory conditions.

They have based their conclusions upon the most complete investigations carried on in the locality in question, which gave them a very good knowledge of it. In that way they were enabled to ascertain that there is, at the place commonly called Alhajuela, a very favorable location for a high masonry dam, the foundations of which could be established upon a very compact rock formation. They ascertained likewise, from complete surveys and from the inspection of the locality made by several members of the commission, that the difficulties of a supply channel between that dam and the upper level of the canal were not of a prohibitory nature. By the building of a branch of the Panama Railroad, crossing the whole country of Alhajuela and closely skirting the proposed line of the feeding channel, the whole locality of the works would be as accessible as those portions of the Isthmus occupied by the canal itself.

Under these conditions, the manner of feeding the canal, based upon the building of a retaining dam in the Upper Chagres and of a supply channel, seemed to the commission perfectly feasible; therefore they agreed that it would be rational to build a canal, with locks, the feeding of which would be procured by such a method as has just been described. The advantage of that solution is the leeway allowed for the selection of the elevation of the summit level, which may thus be much higher than that required for the direct supply through the Chagres proper.

Regulating the freshets of the Chagres.—The question of regulating the Chagres freshets, constituting the third element of the general problem of the building of a canal with locks, was studied with care.

It is true that the continued and careful observations made to that end did not extend over such a length of time as would enable us to affirm that they cover the most extreme cases. They go back, however, to the first years of the old company's existence, and we have been able, by studying the numerous data collated by them and preserved in the records turned over to the new company, also by placing beside these data some observations made at the time of the 1879 freshet, which, from the testimony of witnesses, the marks it left, and the damages it produced, seems to be the greatest within the memory of man (it was, at all events, the greatest which occurred since the building of the Panama Railroad in 1850), to form a very reasonable idea of the extreme conditions to be met in the solving of the problem of the regulation of the freshets of the Chagres. That question has been repeatedly discussed at the meetings of the engineering commission and was the subject of a very searching report from one member; that report can be found in a note accompanying the minutes of the sixty-third meeting. The points given in that report, relating to the maximum output of the largest freshets at important points along the river, have appeared sufficiently valuable to warrant the opinion that, by basing on them the solution of the problem, we may be convinced of having so solved it as to meet the most unfavorable cases. Nevertheless, the general plan adopted is such that, in the hypothesis of the precautions taken to provide for the largest freshets known in fifty years being quite insufficient, nothing would be endangered; the only consequences which could result therefrom would be a small impediment to navigation in the Bohio level and perhaps the necessity of suspending it for a brief period in very exceptional circumstances.

The principle followed by the new company, which the engineering commission

has completely approved, is the one patronized in a general way by the commission of 1890, namely: The formation of reservoirs in which the freshets of the Chagres will scatter over large areas, and where we will temporarily store up in time of flood the volume of water in excess of the quantities which can be safely allowed to freely flow through the canal and its appurtenances.

Such is the principle admitted by both sides as a basis; but the arrangement of the actual plans is capable of a greater efficiency than that of the commission of 1890. In reality that commission had only provided for one lake regulating the freshets, that at San Pablo, containing also the summit level of the canal and formed by the building of a dam at (P. K. 38) of the canal line. That lake, estimated to cover 3,000 hectares (7,400 acres), was to be of such capacity as to impound in a slice of 2 meters (6.56 feet) a volume of 60,000,000 cubic meters (2,119,000,000 cubic feet), to be retained out of the maximum output of the freshets. As said before, the views led to by the new investigations establish that the real volume to be retained at the time of the largest freshets, while allowing a free flow of 1,200 cubic meters (42,380 cubic feet) per second, as the commission of 1890 had done, will probably reach 250,000,000 cubic meters (8,829,000,000 cubic feet); the lake proposed by that commission would therefore be inadequate. Moreover, it has been demonstrated elsewhere that the San Pablo Dam was not practicable.

The discussion of the conditions to be fulfilled in order to harmonize the regulation of the Chagres freshets with the exigencies of the feeding of the canal has established the necessity of making provision for two large reservoirs or artificial lakes. The first one, comprising the central region of the canal and containing one of the levels thereof, would be formed by the building of the Bohio Dam (P. K. 24), and would have a flow line fixed at elevation 20 (65.62 feet) or thereabouts, where it would cover an area of 5,500 hectares (13,600 acres), and be able to impound, between elevations 17 (55.77 feet) and 20 (65.62), a reserve of about 150,000,000 cubic meters (5,297,000,000 cubic feet). This storage would be reduced to about 100,000,000 cubic meters (3,532,000,000 cubic feet) for a fluctuation of only 1.75 meters (5.74 feet).

The second lake would be formed in the Upper Chagres Valley by the building of a dam at Alhajuella. That dam would form the source of supply of the special feeding channel in case it is decided to build the latter.

Considering the height we have been led to give to this dam, we would form on the upper stream a lake which, at the mean elevation of the storage reserve of the freshets, would cover an area of about 2,600 hectares (6,425 acres) and would allow the impounding, for a fluctuation of about 4 meters (13.12 feet), of 100,000,000 cubic meters (3,532,000,000 cubic feet); thus completing, with the reserve gathered in the Lake Bohio, the 250,000,000 cubic meters (8,829,000,000 cubic feet), which should be held during the greatest freshets.

In the event of the big cut at the summit being lowered sufficiently to embody the summit level of the canal in Lake Bohio, the bottom of the canal being then at elevation 10 (32.81 feet), the Alhajuella Lake, nevertheless, should not be dispensed with. Its exclusive use would then be to constitute a large reservoir in which would be stored the volume of water necessary for the feeding and the operating of the canal during the periods of deficiency in the natural output of the Chagres, and that portion of the excess of the freshets could be retained in order to restrict the Bohio Lake to its necessary purposes and to avoid too great fluctuations of its surface. In that case the maximum of reserve to be allotted to the Bohio Lake, in the total amount to be taken from the freshets, would be reduced to 100,000,000 cubic meters (3,532,000,000 cubic feet), and that allotted the Alhajuella Lake would be raised to 150,000,000 cubic meters (5,297,000,000 cubic feet). The height of the dam would not be altered, but the outlet would be lowered, a thing which becomes practicable because there would then be no more feeding channel to supply.

The technical consideration forming the basis of the general solutions just indicated can be summed up as follows: The greatest known freshet can be assumed as having produced at Bohio, at the time of its maximum, a supply of about 3,000 cubic meters (106,000 cubic feet) per second. It is admitted that it is safe to allow the escape, through the overflows of the Bohio reservoirs, to the right and to the left of the canal, a total amount of 1,200 cubic meters (42,380 cubic feet) per second.

The estimates that can be made of the régime of the freshet under consideration lead us to assume that the time during which the output would be greater than 1,200 cubic meters (42,380 cubic feet) is about forty-eight hours, and that the mean total output during that time would be 2,600 cubic meters (91,800 cubic feet) per second. The volume to be impounded would then be 1,400 cubic meters (49,400 cubic feet) per second during forty-eight hours, or 242,000,000 cubic meters (8,546,000,000 cubic feet), say 250,000,000 cubic meters (8,829,000,000 cubic feet). A flood of that magnitude at Bohio can take place only in the event of the determining climatic elements acting with uniform intensity over the whole of the watershed, and we can estimate, by a rational comparison of the data at hand, that in that case 52 per cent of the total output recorded at Bohio would come from the portion of the watershed above Alhaj-

uela; this gives for the considered period of forty-eight hours an output of 234,000,000 cubic meters (8,264,000,000 cubic feet) coming from the upper region. It will then be always possible to retain in the Alhajuela Reservoir 100,000,000 cubic meters (3,532,000,000 cubic feet), or 150,000,000 cubic meters (5,297,000,000 cubic feet), in accordance with the plan adopted. The regulation of the Chagres freshets is, therefore, absolutely insured by the arrangements just described.

If, contrary to expectations, a freshet should overstep the proportions upon which the preceding calculations are based, the level of Lake Bohio could be allowed to rise above the established limit; by these means its storage capacity would be increased and the flow over the spillways of the lake would be forced up beyond 1,200 cubic meters (42,380 cubic feet) per second. The plans are so contrived that no harm would be inflicted to the canal thereby.

The advisability of building the Alhajuela Dam and its appurtenant reservoir, even in the case that a supply channel would become unnecessary (on account of Lake Bohio forming the summit level), results from two main considerations: First, the abandonment of Lake Alhajuela would lead to the concentration of all the surplus flood waters in the Bohio Lake, which only would be possible by either giving the dam several meters more in height, a scheme unanimously looked upon as overbold, or by lowering the minimum level of the lake, as well as that of the bottom of the central cut, by several meters, which is not admissible; second, the abandonment of the upper lake, which constitutes the first regulator of the Chagres floods, would let that river reach in a wild state that portion of the canal territory occupied by the Bohio Lake, where are found, over a length of several kilometers near the point of ingress of the river, bends and natural narrows across which the total volume of the freshets would certainly produce currents detrimental and dangerous to navigation. It is true that recourse could be had to the suspension of navigation at critical times, but it would be a regrettable and dilatory alternative of a nature to throw a certain amount of discredit upon the usefulness of the canal. It is certainly preferable to avoid this objection by means of a relatively small additional outlay. Moreover, it is important to notice that the building of a dam will provide a considerable motive power, which will be advantageously applied in the working of the canal itself. The expense incurred would thus be plainly justified by the financial return to be obtained therefrom.

Consequently, the solution considered by the engineering commission as perfectly judicious and efficacious with regard to the regulating of the floods of the Chagres consists in the formation of two lakes—one in the upper valley, by the building of a masonry dam (cement concrete) at Alhajuela; the other in the lower valley, about the central region of the canal, by the building of an earth dam at Bohio. This second lake will form one of the levels of the canal; and, according as this level would be the summit level, or simply an intermediary one, the feeding would be done either directly through the Chagres itself or indirectly through a derivation of the Chagres through a supply channel connecting the upper dam with the canal.

VARIOUS SCHEMES CONSIDERED—TWO GENERAL TYPES.

The general principles which must serve as a basis for the solution of the three fundamental questions before mentioned, arising in the consideration of a canal with locks, being thus defined and established, there remains to be seen in what different ways they can be applied, and which of such ways is the one which finally appears to be preferable.

We will, consequently, indicate the various technical considerations which it has been deemed useful to study in view of the ultimate formulation of a plan for a canal with locks. Such combinations will be found to differ from one another only as to the solution of special and restricted points which remain to be decided, and which, compared with those already presented, can be qualified as secondary.

The various schemes studied can be classified into two general types—one in which the summit level of the canal has a higher elevation than Lake Bohio (the actual lake, which is necessarily a part of all solutions), and in which the feeding of the canal is done by means of a channel starting from the reservoir of the upper Chagres; the other one, in which the summit level of the canal is part and parcel of Lake Bohio, and in which the feeding of the canal is accomplished by the Chagres itself emptying into this lake.

Solution of the first type.—In the first type a number of combinations can be thought of, varying in accordance with the elevation assigned to the summit level. We shall be restricted in that research by the number of locks to be fixed upon on each slope and by the maximum lift to be allowed for these locks. We at first admitted that five locks on each slope was a maximum not to be overstepped. As for the lift to be adopted, we decided that we would reject the argument advanced by the old company as to the provisions made for the feeding of locks of 11 meters (36.09 feet) lift. These provisions, which were intended for much narrower locks than is now

considered necessary, would not easily fit the new conditions. Therefore nothing is to be retained of that argument, and the question in itself is to be examined without reference to the past.

It is of advantage to reduce the height of the locks as much as possible. The building of the gates and their operation afterwards will be the easier if they are of a smaller height; the probabilities of damage or imperfect maneuvering are also decreased. The consumption of water in the locks is reduced in the same proportion as the height of the fall, and it is an important consideration when we realize that the feeding resources are such that the Chagres itself is inadequate during a certain season of the year, and that it will be necessary to establish reservoirs which are to be drawn from during that period. Again, the time necessary for filling and emptying the locks and for operating them increases with the height of the fall; hence, the time for the crossing of a lock increases with the height of fall, and the commercial usefulness of the canal decreases proportionately.

All these considerations have led the engineering commission to decide that it would not be advisable to go beyond a 10-meter (32.81 feet) lift, and that even a reduction to 9 meters (29.53 feet) would be very desirable if the consequent deepening of the central trench did not give rise to serious objections.

The first scheme studied included, therefore, five locks of 10 meters (32.81 feet) lift. The result was the assumption of elevation 34 (111.55 feet) as that of the bottom of the summit level, with an excavation of 12,000,000 cubic meters (15,696,000 cubic yards) in the large central trench comprising the large bodies known as Emperador and La Culebra. The experience acquired in the course of the present work of excavation in the central trench convinced us that we could, without fear of danger from the nature of the formation, excavate below that elevation without overstepping the time required for the building of all the other parts of the work.

At their meeting of May 20, 1897, the engineering commission agreed that, under all circumstances, they would establish at elevation 30 (98.43 feet) or thereabouts the maximum height of the canal bottom in the summit level.

Under these conditions it was possible, by retaining five locks on each slope, to reduce the lift to 9 meters (29.53 feet).

Another plan was studied upon the basis of the elevation of the canal bottom in the summit level being 29.50 (96.79 feet) and its free maximum water elevation 40 (131.23 feet). The total excavation required by that plan for the central cut is about 15,500,000 cubic meters (20,274,000 cubic yards).

At the same time, and in keeping with the decision to limit at a maximum elevation of 30 (98.43 feet) the bottom of the summit level, we examined a modification of the plan indicated, with five locks of 10 meters (32.81 feet) lift, by suppressing a step of locks and by lowering the bottom of the summit level from elevation 34 (111.55 feet) to elevation 25 (82.02 feet), the total excavation of the central cut being 20,000,000 cubic meters (26,160,000 cubic yards). The study of that scheme, made as thoroughly as the one in which the elevation is 29.50 (96.79 feet), led us to ascertain that it would not be economical, but, on the contrary, would entail a greater expense, while the reduction of $4\frac{1}{2}$ meters (14.76 feet) in the elevation of the summit level would offer but little advantage. The number of locks on each slope would be reduced from five to four, it is true, but the lift would be raised from 9 (29.53 feet) to 10 meters (32.81 feet), with all the consequent drawbacks which have been stated above for the working of the canal and for navigation. Owing to these considerations this arrangement was not deemed rational and was not found to offer real advantages over the former plan with five locks of 9 meters (29.53 feet) lift. On the whole, the plan with elevation 25 (82.02 feet) constitutes an intermediary system, a sort of hybrid, between the scheme of five locks with 9 meters (29.53 feet) lift and the one naturally derived from it by the mere suppression of one step; the engineering commission decided, consequently, that it was reasonable to exclude it from the number of useful solutions to be discussed.

On the other hand, actual work in the central trench having shown more and more reassuring results to warrant the belief that it is possible, without misgivings as to the stability of the formation, to deepen the excavation much below elevation 30 (98.43 feet), already established as a maximum, we thought it very interesting and useful to examine the arrangement directly derived from the system of five locks with 9 meters (29.53 feet) lift by simply suppressing the upper step. Thus we arrive at the system of four locks with 9 meters (29.53 feet) lift, in which the bottom of the summit level is lowered to elevation 20.75 (68.08 feet) with a surface elevation of 31.25 (102.53 feet). This solution leads to the excavation of 24,000,000 cubic meters (31,392,000 cubic yards) in the central trench, instead of 15,000,000 (19,620,000 cubic yards) in the five-lock solution. As to the total cost of the work, the two systems practically balance each other, the increase due to excavation being nearly compensated by the economy realized upon the rest of the work. Therefore the only question which presents itself in the comparison to be made of the two systems arises from the manifest advantage that the second presents over the first in a gen-

eral way, bears upon the time necessary to complete either. The answer to this question will furnish us with the decisive reason of the choice to be made between the two. We must remark here that the study of the second was made in such a way that it coincides with the first in all parts, except as regards the work connected with the summit level, which is altered by the fact of an additional deepening of 8.75 meters (28.71 feet).

Another modification in the same direction, consisting in the suppression of a second step of locks, thus reducing their number to three on each slope, was also examined, but this study is only speculatively interesting. It leads to a lowering of the summit level to nearly the same point as is contemplated for the second type, where the feeding would be provided directly to the Chagres, a doubtless preferable arrangement. There is, then, no reason to further dwell on this modification.

For the reasons just given we were induced to retain two solutions only from those relating to the first type, namely: One with five locks with 9 meters (29.53 feet) lift, requiring elevation 29.50 (96.79 feet) for the bottom of the summit level, the other with four locks of 9 meters (29.53 feet) lift, requiring elevation 20.75 (68.08 feet) for the bottom of the summit level.

Solution of the second type.—The solutions considered relatively to the second type, in which the summit level is a part of Lake Bohio crossed by the Chagres, are reducible to two.

In the one, one lake only is to be built—i. e., Lake Bohio—and it must provide for all necessities, the feeding and operating of the canal and the regulating of the freshets of the Chagres. In this system the bottom of the summit level—being established at elevation 10 (32.81 feet), the maximum level of its water surface, which would be also that of the lake—could reach elevation 24.50 (80.38 feet) in the large freshets, and the Bohio Dam should be raised to elevation 27.50 (90.22 feet), which would be about 30 meters (98.43 feet) above its foundations. In the other a first lake would be formed on the Upper Chagres by the Alhajuela Dam. The function of this lake would be to store up all the water needed for feeding and operating the canal, as well as a great portion (the largest) of the excess of the freshets. In that case, the bottom of the summit level remaining practically at the same elevation as before, the maximum level of Lake Bohio would not be over elevation 20.50 (67.26 feet) and the dam would remain very nearly within the limits established for all the schemes of the first type. This solution is the only one meeting the conditions required for the regulating of the freshets without giving the Bohio Dam such proportions as are considered too bold. On that account principally, and also by reason of the advantage which, everything being considered, the Alhajuela Dam presents by providing a considerable hydraulic power and by permitting a first regulation of the Chagres before its flowing into the canal territory, it has appeared proper to adopt this solution preferably to the first.

Solutions set apart for a selection.—To sum up, three solutions only are retained to be compared in view of a final choice.

The first two, directly related to one another, comprise a summit level at a higher elevation than Lake Bohio, which is fed from a reservoir to be formed in the upper valley of the Chagres through the supply channel.

In the one the bottom of the summit level would be at elevation 29.50 (96.79 feet), and there would be five locks on each slope. In the other the bottom of the upper canal level would be at elevation 20.75 (68.08 feet), and there would be only four locks on each slope.

In the third solution the summit level is a part of Lake Bohio formed under the same conditions as before, and the canal is fed directly through the Chagres, emptying into the summit level after crossing a reservoir formed by a dam in the higher valley, mainly in view of assisting in the regulation of the freshets and of taming the river before its arrival in the canal territory. The bottom of the summit level would be closely at elevation 10 (32.81 feet).

Reason for the selection of a solution.—The detailed estimates made for each one of these solutions show that, as regards merely the work to be done, they differ but little from each other. The total expense foreseen for the work itself, including large amounts for incidentals, are:

	Francs.	Dollars.
For the plans at elevation 29.50 (96.79 feet).....	490, 000, 000	94, 570, 000
For the plans at elevation 20.75 (68.08 feet).....	512, 000, 000	98, 816, 000
For the plans at elevation 10.00 (32.81 feet).....	531, 000, 000	102, 483, 000

We know that, concerning the big central cut, the formation, well known to-day, allows of the adoption of one or the other of these elevations without fear of great danger arising from the stability of the ground.

Under these conditions the time necessary to carry through one or the other of these three solutions becomes the determining reason of the choice to be made between them. This question has been the object of prolonged discussion among the members of the engineering commission; discussion summed up in the minutes of the ninety-sixth session. It has been acknowledged, and we can state that it is not possible to formulate to-day a conclusive answer; so many elements, of which it is impossible to calculate the value with certainty, are of such character as to bear upon the activity which can be developed in the execution of the work that we can not establish beforehand its exact duration. Nevertheless, especially as regards cuts and fills, we can form a very close idea by the consideration of what was formerly performed by the old company, and of what is performed to-day, applying, however, to such results, such corrections as can be rationally deduced from the progress accomplished in the methods of work, and to be accomplished by organization on a large scale. We can likewise obtain important information from similar great works executed recently, making ample allowance for the differences in climate and in the conditions of labor.

By such means we have formulated estimates as to the time necessary for the excavation, which appear to us as reasonable.

The problem involved in the cutting of the Culebra is obviously of paramount importance. It is undoubtedly the work of excavation which will last the longest, and which, for all operations of that class on the whole canal, must determine the amount of time needed.

The amounts to be excavated at that special point, between P. K. 53.600 and P. K. 55.500 in the three plans to be compared, are:

	Cubic meters.	Cubic yards.
In the plan at elevation 29.50 (96.79 feet), about	8,200,000	10,725,600
In the plan at elevation 20.75 (68.08 feet), about	11,200,000	14,642,800
In the plan at elevation 10.00 (32.81 feet), about	15,600,000	20,404,800

Simultaneously with the excavations the other structures must be erected, and it is proper to establish the principle that by applying to the working of each of these two groups of work all possible energy with the means of execution and the labor resources upon which we may reasonably rely, it is desirable that the completion of the two groups be effected very closely—about the same time—a condition which would reduce to a minimum the duration of the undertaking. This consideration is, from all points of view, of capital importance, and it constitutes the determining reason for the decision to be agreed upon as to the plan to be accepted.

Now, among the various works to be executed must be mentioned a complex portion, the execution of which can only be accomplished in successive installments, and will certainly require a longer time than all the others. It is the aggregate of the structure constituting the closing of the valley at Bohio (dams, locks, overflows, etc.).

The study made of the methods to be adopted for the construction of these structures, which is summed up in the minutes of the ninety-fifth session of the engineering commission, leads to the conclusion that the total time necessary for the completion of this group of structures will be about ten years. It is not to be doubted that within the same time all the other works, including the change of location of the Panama Railroad and the supply channel, if needed, can be completed.

The question of the time needed for each of the three plans under consideration is reduced to comparing on one side the group of the Bohio works, which, being the same in the three plans, will require the same time—about ten years—and, on the other, the work at La Culebra, the excavation of which varies considerably in the three plans; then to considering in which of them the excavation of that big cut will require practically the same time as the Bohio works. After thoroughly discussing this question, the engineering commission decided that, given the actual experimental data, the plan with elevation 20.75 (68.08 feet) was the most favorable in that it embodied the fundamental condition of equilibrium in the time required for the two principal groups of works; consequently, at their meeting of September 8, 1898 (ninety-seventh meeting), they formulated the conclusion of their studies and advised the company to adopt the plan just mentioned, the detailed description of which will be the object of the following chapter.

It is clear, from the short analysis of all the plans considered and from the debates arising therefrom, that, under the very teaching of the facts brought out during the experimental work which the new company had decided to have performed before a final decision should be reached, and that, owing also to the data furnished by the surveys made and the test pits sunken on the Isthmus, in view of all the alternate

solutions that could reasonably be thought of, the present plan has been evolved progressively. At the beginning there was a preference for the scheme of a canal with a high-summit level, which was later changed for that more advantageous one of a canal with a much lower summit. This solution, gradually brought about by the procurement of material facts, has been the consequence of the policy of protracted experimental research and of painstaking study which the new company thought proper to adopt in the beginning. It also constitutes the justification of that policy.

CHAPTER II.

DESCRIPTION OF A PLAN FOR A CANAL WITH LOCKS, WITH BOTTOM OF SUMMIT LEVEL ESTABLISHED AT ELEVATION 20.75 METERS (68.08 FEET).

The main questions which will be subject of this chapter relate to—

First. The plan or location of the canal.

Second. The longitudinal profile showing the various levels.

Third. Standard cross sections adopted for the several levels, widths, and areas of these levels.

Fourth. The general arrangements adopted for the locks.

Fifth. The ports of ingress or waiting basins provided at each end of the canal.

Sixth. The general earthworks of the canal.

Seventh. The various structures.

Eighth. The feeding system and its appurtenances.

Ninth. The upper Chagres Railroad.

Tenth. The arrangement adopted for the regulation of the freshets, derivations and widenings.

Eleventh. The change of location of the Panama Railroad.

Twelfth. The general expense of the undertaking.

ARTICLE 1.

THE PLAN OR LOCATION OF THE CANAL.

The location adopted for the plan of canal under consideration is precisely the same which was agreed upon and followed by the old company for the scheme of a canal without locks, and later for the scheme of a canal with locks, which they had begun to substitute for the first. That location was judiciously selected, and there was no technical reason to modify it. On the contrary, there was economy in preserving it in order to benefit by the useful work already done over nearly the whole length of it. It is only necessary to make a few local changes in order to replace curves by straight lines at points of the old location where locks are to be located under the present scheme.

The location includes everywhere on the normal course of the canal large radii, of which the minimum is 3,000 meters (9,843 feet), except in that part corresponding to the central cut, where, on account of the more distorted nature of the ground, the radius of a few curves is reduced to 2,500 meters (8,202 feet). At some special points forming waiting basins on the approaches of the locks the radius at the theoretical center line falls to 2,500 meters (8,202 feet) (Bohio locks), and even to 1,900 meters (6,234 feet) (Obispo locks); but there the width of the canal has been largely increased. Extra widening, moreover, will be provided for all the curves in proportion to their radii, according to the best acknowledged rules.

The total length of the canal, from its starting point in the bay at Folk River on the Atlantic to its terminus in the Bay of Panama at La Boca on the Pacific, is 69 kilometers (42.87 miles); but deep water being met with only in the vicinity of Noas Island, 5,400 meters (3.36 miles) further than La Boca, a channel must be dug at sea from that point to the meeting of the permanent deep waters, thus increasing the total length of the canal to 74.4 kilometers (46.23 miles), including that channel.

ARTICLE 2.

LONGITUDINAL PROFILE.

The bottom of the summit level is established at elevation 20.75 meters (68.08 feet) above mean sea level. The minimum depth adopted being 9 meters (29.53 feet), it follows that the minimum elevation of the water surface in the summit level will

be 29.75 (97.61 feet). A possible oscillation of 1.5 meters (4.92 feet) is contemplated to provide for the natural inflow outside of the regular supply, and also for the unavoidable variations of the consumption, which require a certain reserve supply. The maximum water surface will thus reach a maximum elevation of 31.25 (102.53 feet). As there are hardly any tides on the Atlantic side at Colon, we have a total height of 31.25 meters (102.53 feet) to provide for between that ocean and the summit level. To that end the plan contemplates only one intermediary level formed by Lake Bohio, beginning at P. K. 24.5 of the canal at the Bohio locks and ending at P. K. 46, at the Obispo locks.

A double step of two locks is provided at Bohio, and another at Obispo. The water surface in the intermediary level will fluctuate between minimum elevation 16 (52.49 feet) and maximum elevation 20 (65.62 feet). The bottom of the canal, which will form almost throughout the lake a buoyed channel, will then be established 9 meters (29.53 feet) below elevation 16 (52.49 feet), or at elevation 7 (22.97 feet). The bottom of the maritime level is at elevation -9 (-29.53 feet). The Pacific Ocean gives rise to tides varying between the extreme elevations -3 (-9.84 feet) and +5 (+16.40 feet). The total height to provide for between the lowest tide and maximum elevation of the summit level is then 34.25 meters (112.37 feet) on that slope. To that end the scheme provides for two intermediary levels, one located between Paraiso (P. K. 57) of the canal where the lock closing the summit level terminates, and Pedro-Mignel (P. K. 59), where there is a double step of two locks; the other level is located between the last group of locks and Miraflores (P. K. 61.8), where there is one lock. The surface of the water in those levels can vary 1 meter (3.28 feet) above their minimum elevation. The elevations of the canal bottom are 13.25 (43.47 feet) in the level adjacent to the summit level, -3.75 (-12.3 feet) in the following level and -12 (-39.37 feet) in the maritime channel.

The double step of two locks at Bohio is intended to cover a total difference of elevation which can vary from elevation 0 to elevation 20 (65.62 feet) with a possible fall of 10 meters (32.81 feet) in each lock; but we must notice, as stated hereafter, that elevation 20 (65.62 feet) in Lake Bohio is an extreme figure, which may only be reached during the greatest freshets—that is, on very rare occasions. We can admit that generally the surface of the lake will not rise above mean elevation 18 (59.06 feet), and that with regard to normal conditions of operation the Bohio locks are of 9 meters (29.53 feet) lift.

The maximum difference of elevation to be provided for between the Bohio level and the summit level is between 16 (52.49 feet) and 31.25 (102.53 feet)—say 15.25 meters (50.03 feet) with two locks—giving a maximum lift of 7.65 meters (25.1 feet) for each one.

On the Pacific slope the water surface of the level adjacent to the summit level is at minimum elevation 22.25 (73 feet), which gives a maximum fall of 9 meters (29.53 feet) for the Paraiso lock. The surface of the water in the next level is at minimum elevation 5.25 meters (17.22 feet); the maximum elevation of the preceding one being 23.25 (76.28 feet), we have to overcome with two locks a maximum difference of elevation of 18 meters (59.06 feet)—say 9 meters (29.53 feet) with each lock. Finally, the surface in the maritime level varying between -3 (-9.84 feet) and +5 (+16.4 feet), the Miraflores lock, which ends it, will have to overcome a difference in elevation which may vary between 2.25 (7.38 feet) and 9.25 meters (30.35 feet).

ARTICLE 3.

STANDARD CROSS SECTIONS, WIDTHS, AND AREAS OF THE SEVERAL LEVELS.

The standard cross sections for the several levels which were finally adopted by the engineering commission at their ninety-third meeting are shown in the exhibits. Their peculiarities can thus be resumed:

Atlantic Channel.—Bottom width, 30 meters (98.43 feet) or 34 meters (111.55 feet), according to its being dug in ordinary earth or in rocky ground, with slopes of 3 to 2 and 2 to 3 for the wetted prism, and berms 3 meters (9.84 feet) to 2.5 meters (8.2 feet) below the water surface. Two waiting stations are provided along this level, the length of which is 23,880 meters (14.84 miles). These waiting stations have a width of 60 meters (196.85 feet) at bottom and a length of 600 meters (1,968.52 feet), not including the approaches leading to the normal parts of the canal.

Bohio level.—This level, forming a channel across Lake Bohio, extends from (P. K. 24.483) to (P. K. 46). Its bottom width in the normal portions is 50 meters (164.04 feet) with slopes of 3 to 2 in common earth and 52 meters (170.61 feet) with slopes of 2 to 3 in rocky ground.

Summit level.—This level extends from (P. K. 46.603) to (P. K. 56.306). It includes the deep trench through the mountains dividing the two ocean watersheds. The standard section adopted for its normal portions includes for the wetted prism a bottom width of 36 meters (118.11 feet), slopes of 1 to 2, and berms of from 3 meters

(9.84 feet) to 2.5 meters (8.2 feet) below the water surface. Above the wetted prism the cross section includes bermes 5 meters (16.4 feet) wide for every 10 meters (32.81 feet) vertical distance, connected by slopes of 2 to 5, except through the clayey layers at the top, where the slopes are 3 to 2.

Level between Paraiso and Pedro Miguel.—This level, next to the summit level, extends from (P. K. 56.643) to (P. K. 59.07). The same standard cross section as that of the Atlantic level has been adopted. The greatest portion of its length, however, will be made up of the waiting stations at the approaches of the locks.

Level between Pedro Miguel and Miraflores.—This level, which extends from (P. K. 59.373) to (P. K. 61.79), shows likewise the same cross section as the Atlantic channel, and, like the preceding one, is mostly made up of the waiting stations at the approaches of the locks.

Pacific level.—This level extends from (P. K. 61.453) to (P. K. 74.400) with a bottom width of 30 meters (98.42 feet) and slopes of 5 to 1 from Miraflores to its terminus at La Boca, where a basin of ingress will be established. From there to the end it consists of a sea channel with a bottom width of 50 meters (164.04 feet) and slopes of 5 to 1.

In all the levels, above and below the locks and close to them, waiting stations or basins are provided, which will also be crossing points for vessels; these basins will have generally a bottom width of 62 meters (203.41 feet) and a clear length of 700 meters (2,296.61 feet). The length of the curves connecting these stations with the normal section being 100 meters (328.09 feet), the basin adjacent to the Obispo locks on the Atlantic side, which is on a curve with a theoretical radius of 1,900 meters (6,233.65 feet), is provided with a bottom width of 85 meters (278.87 feet).

The respective areas of the several intermediary levels are the following at their maximum water elevation:

	Hectares.	Acres.
Bohio level, about	5,500	13,591.05
Summit level, including a small natural lake towards Obispo.....	160	395.38
Level from Paraiso to Pedro Miguel.....	16	39.54
Level from Pedro Miguel to Miraflores.....	13	32.12

The area of 160 hectares (395.38 acres), which the summit level covers, with the additional 1.5 meters (4.92 feet) of water above its minimum elevation, constitutes a reserve supply of two million four hundred thousand (2,400,000) cubic meters (85,000,000 cubic feet). This reserve may seem inadequate to amply meet the fluctuations of supply and consumption. It will then be proper to increase it by the formation of a little lake near Paraiso, which can be formed by building a dam across the valley of the Conga and the Mallejon. An additional area of about 100 hectares (247.11 acres) would thus be provided which would bring the total reserve up to 3,900,000 cubic meters (138,000,000 cubic feet). It could still be made larger by increasing to 2 meters (6.56 feet) the total oscillation of the water level.

ARTICLE 4.

GENERAL ARRANGEMENT ADOPTED FOR THE LOCKS.

The general conditions required for the locks have been the object of lengthy discussion, as a result of which the following dispositions have been adopted at the ninety-fourth meeting of the engineering commission:

The locks are to be twin locks of a useful length of 225 meters (738.2 feet) and a width of 25 meters (82.02 feet) in the one and 18 meters (59.06 feet) in the other. However, the engineering commission, like the company, believe that for good reasons both are likely to be built with a width of 25 meters (82.02 feet). One of the twin locks (the narrower one) would be provided with intermediary gates.

The building of one of the twin locks could be postponed (without great inconvenience) until after the opening of the canal to navigation, if the company should find a real financial advantage in that policy.

The system of gates, as adopted in principle, is that of pivoted single doors. This arrangement could be modified, however, in some cases, in accordance with the ideas submitted by special builders from whom detail plans are to be obtained.

Such are the data upon which the locks have been planned.

There is provided below the minimum elevation of the water a vertical depth over the sill of 9.5 meters (31.17 feet) at the side walls, and of 10 meters (32.81 feet) on the axis.

The thickness of the middle wall between the twin locks was determined from the

hypothesis that one of the locks might be eventually empty in case of repairs, and it was fixed at 15 meters (49.21 feet) at the narrowest part, near the point of attachment of the gates. The filling and emptying of the locks is insured by means of cast-iron pipes 2.8 meters (9.19 feet) and 2.7 meters (8.86 feet) diameter, located under the floor on each side of the locks, and provided with vertical branches of 0.4 meter (1.32 feet) diameter, 2 meters (6.56 feet) apart. This arrangement allows of a simultaneous supply over the whole surface of the lock. The pipes will be controlled by vertical shafts containing cylindrical valves and connected with the canal. These shafts and the aqueducts through which they are connected with the cast-iron pipes are located in the masonry of the side walls.

The masonry of the locks will generally be made of cement concrete. Only those parts intended for special work will be of cut stone, which will be shipped from Europe all ready to lay. Guard gates are provided on the upstream side of the locks, the object of which is to prevent the accidental emptying of the levels.

Timber guards will also be built at the approaches of the locks, and on a line with their sides, to facilitate the entrance or the exit of the vessels.

The details of this timber work must be especially studied in due time, and so will be those for the gates, machinery, and generally for all mechanical appliances.

These items are mentioned in the present report in a tentative manner, in view especially of estimating their cost.

ARTICLE 5.

BASINS FOR THE INGRESS AND EGRESS OF SHIPS AT EACH END OF THE CANAL.

It has been thought proper to limit the design of these basins for the present to what will be absolutely necessary for the first needs of the operation of the canal. It will be time when navigation increases to complete the structures which will constitute fully equipped ports of ingress. There is already in Colon, near the point selected for the origin of the canal, a port provided with basins and wharves in direct communication with the Panama Railroad.

These structures, although on a restricted scale, will be, at the beginning of the operation of the canal, sufficient for the maneuvers of the vessels before their entry into the canal. As, however, the roadstead is rough when certain winds are prevailing, it is important to provide vessels intending to cross the Isthmus with a safe shelter where they can wait. To that effect, at the very end of the canal, in prolongation of the bay of Folk River, a spacious basin is to be built 150 meters (492.13 feet) wide and 1,000 meters (3,280.87 feet) long. Mooring facilities are to be established on the shores and timber guards are to be erected along portions of that basin to allow of the loading and unloading of vessels.

At the other end of the canal, at La Boca, where it empties into Panama Bay, a large basin is provided with an adjacent wharf connected with one of the terminal stations of the Panama Railroad. This port might be gradually improved later on. These works have been executed by the Panama Railroad Company, which thought that a great advantage could be derived for commercial intercourse from thus coming early in contact with navigation, whereas formerly, on account of the impossibility of reaching the port at Panama, vessels of too large a draft had to discharge their cargoes at a point opposite Naos Islands, at a great cost for lighterage.

The maritime channel between these islands and the port of La Boca has only been dug to a depth of 9 meters (29.53 feet) below mean water for the present; it will have to be deepened 3 meters (9.84 feet) when the canal is completed.

ARTICLE 6.

GENERAL EARTHWORKS OF THE CANAL.

The excavations necessary to complete the canal under the conditions of the adopted plans are divided as follows in the several levels:

Maritime Atlantic level.—We have indicated in article 3 the standard cross section which was adopted for this level; it required a width of 30 (98.43 feet) or 34 (111.55 feet) meters, according as it was to be dug in ordinary or rocky ground. This level was dug by the old company for nearly its whole length to very near the final depth. The bottom so reached has been in a measure refilled in places by the intrusion of the Chagres. The old company had given a width of only 22 meters (72.18 feet) to the bottom of the canal, and the excavation was thrown out in mounds on the shores by the dredging machines with long discharge pipes used in the work. In order to enlarge the section to the standard one now adopted, those spoil banks must be removed. The new company thought that, to save at the outset a large expense, they could accept for the present that bottom width of 22 meters (73.18), and wait until after the opening of the canal for the enlarging of the same by easy dredging operations.

It is under these conditions that the excavation to be made now in that level was calculated. It is as follows:

	Cubic meters.	Cubic yards.
Excavation in ordinary soil.....	5, 870, 000	7, 678, 000
Excavation in rocky ground.....	538, 000	703, 700
Total	6, 408, 000	8, 381, 700

Of this amount we may expect that 4,800,000 cubic meters (6,278,000 cubic yards) can be excavated directly with dredging machines.

Bohio level.—The excavation necessary to form a channel of a bottom width of 50 meters (164.04 feet) across Lake Bohio, of which this level is a part, is as follows:

	Cubic meters.	Cubic yards.
Earth excavation.....	6, 350, 000	8, 306, 000
Rock excavation.....	2, 000, 000	2, 616, 000
Total	8, 350, 000	10, 922, 000

A portion of the earth excavation can undoubtedly be made with dredging machines.

Summit level.—The excavation necessary to form this level, according to the cross section indicated in article 3, is as follows:

	Cubic meters.	Cubic yards.
Earth excavation.....	6, 250, 000	8, 175, 000
Hard or rocky excavation.....	17, 600, 000	23, 021, 000
Total	23, 850, 000	31, 196, 000

In this total the excavation of the Culebra proper, between (P. K. 53.6) and (P. K. 55.5), is 11,200,000 cubic meters (14,650,000 cubic yards), and inasmuch as, under the old company, nearly all of the clayey materials of the upper stratum was excavated, the above amount represents almost entirely an excavation in hard or rocky ground.

The spoil banks for this large excavation will probably be formed for the Culebra, in the Lirio Valley upstream and the Quebrada Mallejon Valley downstream; they are more than ample for the purpose.

For the Emperador the lateral depressions along the line of the cut can be utilized, also the Rio Mandingo Valley, which is situated at the upstream extremity, and will accommodate a large quantity of material.

Paraiso Level.—This level, 2,427 meters (7,962.67 feet) long between the Paraiso Lock and the Pedro Miguel ladder, will require:

	Cubic meters.	Cubic yards.
Earth excavation.....	759, 600	993, 600
Rock excavation.....	693, 400	907, 000
Total	1, 453, 000	1, 900, 600

Pedro Miguel level.—This level, 2,117 meters (6,945.6 feet) long between the Pedro Miguel and the Miraflores locks, will require:

	Cubic meters.	Cubic yards.
Earth excavation.....	617, 600	807, 800
Rock excavation.....	450, 000	588, 600
Total.....	1, 108, 400	1, 396, 400

Pacific level.—The digging of this level will require:

	Cubic meters.	Cubic yards.
Earth excavation	9,051,000	11,839,000
Rock excavation	588,000	769,100
Total	9,639,000	12,608,100

The greatest part of the earth excavation can be done with dredging machines but it must be carried away quite a distance, thus destroying in part the advantages of that method of excavation.

SUMMARY.

The general excavation required for the digging of the canal proper is summarized in the following table:

Levels.	Excavation.					
	Earth.		Hard and rocky.		Total.	
	Cubic meters.	Cubic yards.	Cubic meters.	Cubic yards.	Cubic meters.	Cubic yards.
Atlantic maritime	5,870,000	7,678,000	538,000	703,700	6,408,000	8,381,700
Bohío	6,350,000	8,306,000	2,000,000	2,616,000	8,350,000	10,922,000
Summit	6,250,000	8,175,000	17,600,000	23,021,000	23,850,000	31,196,000
Paraiso	759,600	993,600	693,400	907,000	1,453,000	1,900,600
Pedro Miguel	617,600	807,800	450,800	588,600	1,108,400	1,396,400
Pacific maritime	9,051,000	11,839,000	588,000	769,100	9,639,000	12,608,100
Total	28,897,200	37,799,400	21,870,200	28,605,400	50,808,400	66,404,800

The above quantities were calculated by means of cross sections made before beginning the actual work on the central cut. The excavation made in that cut is about 3,000,000 cubic meters (3,924,000 cubic yards), and is included therein. They will compensate supplementary quantities not now calculated, but expected from causes that we can not exactly determine to-day, such as possible landslides and extra widenings to be given the canal at some curves. The same can be said of the dredgings just finished for the ingress channel and the port of La Boca, which amount to about 2,000,000 cubic meters (2,616,000 cubic yards).

Paving canal slopes.—It will be necessary, to insure stability for the slopes of the canal at certain points, to face them with masonry. We can not determine to-day the size and extent of that facing, the necessity for which will be disclosed only at the very time of excavating.

A general facing, however, has been provided for the slopes of the wetted prism in the Summit Level, from the berm, which has been located 2.50 meters (8.02 feet) below the maximum water surface.

The quantity of cement concrete masonry required for this facing is 69,500 cubic meters (90,900 cubic yards), which was doubled to cover the revetment work which may be found necessary at other points.

ARTICLE 7.

STRUCTURES.

The principal structures are: First, the locks; second, the dams which accompany them and close the several levels. These dams are accompanied with spillways to facilitate the escape of surplus water.

Locks.—The general arrangement adopted for the locks was summarized in article 4; only the peculiarities of their construction are to be now considered. The cost was calculated in the hypothesis of the immediate building of both chambers, 25 meters (82.02 feet) and 18 meters (59.06 feet) wide, respectively.

Under the title of general expense, the increased expense arising from the widening of the narrower chamber to 25 meters (82.02 feet) will be mentioned, as well as the temporary reduction which would follow the postponement of the construction of the narrower chamber.

On account of the difficulty of securing the services of a great number of masons

on the isthmus, it was thought proper to exclude, as much as possible, stone from the structures, and to substitute concrete masonry, which does not require skilled labor.

The copings (hollow quoins), gate recesses, and sills are of hard stone, which are to be forwarded from Europe, all cut. Most of the locks are located in knolls almost entirely of rock, so the side walls may be simply formed with a strong facing applied against the sides of the cuts. In that case the facing would be 3 meters (9.84 feet) thick.

When the side walls have to resist earth pressure their thickness is calculated according to ordinary methods, allowing a minimum pressure of 6 kilograms per square centimeter (85.3 pounds per square inch).

The dividing wall was calculated according to the method used for a masonry dam, supposing one of the chambers to be empty and the other full.

A general floor in the shape of an inverted arch is provided between the side walls. The heads of the side walls are provided with recesses to receive floating gates which are to act as water tight doors in case of repairs to be made to the several parts of the locks. The special arrangement for each group of locks is as follows:

Bokio locks.—These locks consist of a double-stepped structure located in a knoll formed of a volcanic conglomerate of various rocks cemented with petrified sand. This ground makes a good resisting foundation, and is of sufficient length to admit a double step of 2 locks. At either end it suddenly disappears under sandy and peaty soil. The total length occupied by the masonry of these stepped locks is 603 meters (1,978.36 feet); the height of the largest gates on the downstream side of each chamber is 22.8 meters (74.8 feet), thus divided:

	Meters.	Feet.
Projection over maximum water elevation.....	0.5	1.64
Distance from maximum water elevation to top of sill.....	22.0	72.18
Rest against sill.....	.3	.98
Total.....	22.8	74.8

The width of the gates for the larger chamber is 27 meters (88.58 feet), including 1 meter (3.28 feet) rest against each side wall. The gates of the smaller chamber are 20 meters (65.62 feet) wide. These sizes relate to the gates of all the locks.

The estimated quantities for this group of locks are as follows:

Excavation.....	1,031,000 cubic meters	=1,348,600 cubic yards.
Masonry.....	432,300 cubic meters	=565,500 cubic yards.
Lock gates.....	3,805 square meters	=40,957 square feet.
Cast-iron pipes.....	11,700 meters.	=38,390 feet.
Cylindrical valves.....	16	=

Obispo locks.—These locks are also arranged in two steps for a total maximum fall of 15.25 meters (50.03 feet). They are to be built in a compact mass of volcanic rock. The total length of the masonry will be 603 meters (1,978.36 feet), as before. It would be easy to build on the same location a treble step of locks. The height of the larger gates is in this case 19.25 meters (63.16 feet).

The estimated quantities for this group of locks are as follows:

Excavation.....	967,000 cubic meters	=1,265,000 cubic yards.
Masonry.....	372,000 cubic meters	=486,600 cubic yards.
Lock gates.....	3,230 square meters	=34,770 square feet.
Cast-iron pipes.....	1,700 meters	=5,580 feet.
Cylindrical valves.....	16	=

Paraiso lock.—This lock, to be built on a rock foundation, will be 337 meters (1,105.65 feet) long. The arrangement of the several parts is the same as in the preceding locks. The maximum fall it is intended to overcome is 9 meters (29.53 feet), and the height of the larger gates will be 19.8 meters (64.96 feet).

The estimated quantities for this lock are as follows:

Excavation.....	570,000 cubic meters	=745,600 cubic yards.
Masonry.....	215,000 cubic meters	=281,250 cubic yards.
Lock gates.....	1,905 square meters	=20,510 square feet.
Cast-iron pipes.....	850 meters	=2,790 feet.
Cylindrical valves.....	10	=

Pedro Miguel locks.—The locks provided at this point are in two steps, with a maximum fall of eighteen (18) meters (59.06 feet).

They will be built upon a rock foundation; the total length of the masonry is 603 meters (1,978.36 feet). The height of the larger gates is 19.8 meters (64.96 feet).

The estimated quantities for this group of locks are as follows:

Excavation	687,300 cubic meters = 899,000 cubic yards.
Masonry (aggregate)	404,500 cubic meters = 529,100 cubic yards.
Lock gates	3,275 square meters = 35,255 square feet.
Cast-iron pipes	1,700 meters = 5,600 feet.
Cylindrical valves	16

Miraflores lock.—This lock will cover a total length of 337 meters (1,105.65 feet), and, like the others, will have a rock foundation.

It will serve as a tide lock, and will have a variable fall of from 9.25 meters (30.35 feet) at the time of the lowest tides, with regard to the maximum elevation of water in the preceding level, to 2.25 meters (7.38 feet) at the time of the highest tides. The height of the large gates will be 20.05 meters (65.78 feet).

The estimated quantities for this lock are as follows:

Excavation	362,800 cubic meters = 474,600 cubic yards.
Masonry (aggregate)	228,680 cubic meters = 239,150 cubic yards.
Lock gates	1,900 square meters = 20,460 square feet.
Cast-iron pipes	850 meters = 2,790 feet.
Cylindrical valves	10

Dams and spillways.—The locks are all connected with earth dams, the object of which is to fill any depressions on either side of the canal and to thus close up the several levels. The conditions of execution vary according to local circumstances; they are summarized below. The plans give the fullest information.

Bohio works.—There will be constructed at Bohio—

First. A dam across the valley of the Chagres, abutting on the left against the "Bohio Hill," so called, in which the locks are located, and on the left against the "Cemetery Hill," so called.

Second. A spillway to let out, in time of freshet, from the surplus water not retained in the lakes, a volume of 500 cubic meters (17,700 cubic feet) per second in the channels built by the old company on the left of the canal to the sea, some parts of which only remain to be completed.

This spillway will be located in a hollow formed by "Cemetery Hill."

Third. A spillway to let out at least 700 cubic meters (24,700 cubic feet) per second in the channels provided, or to be provided, to the right of the canal, and through them in the very bed of the Chagres at a point where the river completely diverges from the line of the canal.

This spillway will be built in a depression of land formed by the Rio Gigante gap; the escaping water will first flow in the swamps of Pena-Blanca to the right of the canal between P. K. 20.5 and P. K. 21.5

The Bohio level, which forms a vast lake, the object of which is to temporarily retain a portion of the freshets up to 150,000,000 cubic meters (5,297,000,000 cubic feet), as explained in chapter 1 of this report, will have a variable surface which may reach a maximum elevation of 20 (65.62 feet) or fall to a minimum elevation of 16 (52.49 feet).

A layer, 1 meter thick, is to be stored in it at the beginning of the dry season to face possible losses through evaporation or percolation; the normal elevation of this level is therefore 17 (55.77 feet). The 3-meter (9.84 feet) layer between this elevation and elevation 20 (65.62 feet) has an approximate area of 5,000 hectares (12,360 acres), and will consequently impound 150,000,000 cubic meters (5,297,000,000 cubic feet).

The dam to be built across the Chagres will retain 20 meters (65.62 feet) of water above its bed, which here is at about elevation zero. It will be brought up to elevation 23 (75.46 feet) with an additional height of 3 meters (9.84 feet) above the maximum water elevation in the lake. Numerous test pits sunken to great depths on the line and in the neighborhood of the proposed dam did not show any rock in the middle of the valley. It is therefore necessary to build here an earth dam. The geological section shows that the underground formation is favorable to a work of that character. The clayey puddle forming the body of this dam can be started at mean elevation —15 (—49.21 feet), in a compact argillaceous formation or an impermeable sandy clay bed constituting a thick layer resting on a very compact bottom of argillaceous sand and gravel.

This dam will have a length of 392 meters (1,286.1 feet) at top. The cross section shows the arrangement adopted for construction.

The object of the great mass of riprap against its downstream slope up to elevation 16 (52.49 feet) is mainly to permit great freshets to submerge the structure during construction without any danger of destruction or even of great damage. This may happen only in the hypothesis of the dam not having been completed to eleva-

tion 14 (45.93 feet). When that elevation is reached, the contemplated spillways at elevation 10 (32.81 feet) or 11 (36.09 feet), where rock is met upon which to rest their foundations, would then be stripped to the rock and the channels thus prepared would then allow free passage to the freshets.

The methods to be followed in the building of this dam were adopted at the sixty-seventh and ninety-fifth meetings of the engineering commission; it was then recognized that by reason of the unavoidable necessity of proceeding by gradual steps in the building of the locks, the dam, and spillways, the execution of the works for the closure of the valley at Bohio and for the regulation of the overflow of the lake would require no less than about ten years.

The spillways are to be of masonry and fitted with water-tight sliding metallic gates; such, for instance, as the Stoney gates used in the Manchester Canal.

The estimated quantities for these works, i. e., dams and spillways, are:

Excavation	1, 057, 800 cubic meters =	1, 384, 000 cubic yards.
Puddled dam embankment.....	352, 700 cubic meters =	461, 400 cubic yards.
Concrete masonry	34, 050 cubic meters =	44, 550 cubic yards.
Dry masonry	18, 900 cubic meters =	24, 750 cubic yards.
Riprap.....	39, 800 cubic meters =	52, 100 cubic yards.
Timber for sheet piling.....	3, 260 cubic meters =	4, 270 cubic yards.
Ironwork	213, 500 kilograms =	470, 700 pounds.
"Platelages"	370 square meters =	3, 990 square feet.
Gate system.....	425 square meters =	4, 580 square feet.

Obispo Dam.—The Obispo locks, at the end of the summit level on the Atlantic side, are connected with a dam closing the Rio Obispo Valley, thus making this rio a part of the summit level itself.

The location of this dam is in rock throughout, and the structure is to be of concrete masonry.

Its lowest foundations are at elevation 13 (42.65 feet), the surface of the water it retains being at a maximum elevation of 31.25 (102.53 feet); it will rise 18 25 meters (59.88 feet) above the lowest point of the dam. The length at top of this dam is 100 meters (328.09 feet); a spillway 50 meters (164.04 feet) long, with gates, is there provided. Its sill is at elevation 30.5 (100.07 feet), and, without the water reaching a higher elevation than 31.25 (102.53 feet), it will accommodate the flow of 70 cubic meters (2,500 cubic feet) per second in case the elevation of the water in the level becomes excessive. The section of the dam is established according to the best rules in use to-day.

The estimated quantities for this dam are thus resumed:

Excavation.....	4, 460 cubic meters =	5, 850 cubic yards.
Masonry.....	8, 000 cubic meters =	10, 500 cubic yards.
"Platelages" in wood	440 square meters =	4, 750 square feet.
Ironwork.....	20, 000 kilograms =	44, 100 pounds.
Gates	52 square meters =	559.73 square feet.

Paraiso Dam.—The Paraiso locks, at the end of the upper level, on the Pacific side, are likewise connected with a dam in the depression formed by the Rio Grande Valley. This structure, of little importance, is to be on a rock foundation, and is to be of concrete masonry. Its length at top is 99 meters (324.81 feet) and its greatest height 8 meters (26.25 feet).

A spillway, with regulating gates, is provided outside from the dam, to assist, if necessary, in carrying away the excess of water from the level. The regulating gates of this spillway occupy a space 35 meters (114.83 feet) long; their sill is at elevation 30.5 (100.07 feet), and their flowing capacity is 50 cubic meters (1,765 cubic feet) per second under the head corresponding to the maximum elevation of the level.

The estimated quantities for this dam are as follows:

Excavation.....	442,700 cubic meters =	579,100 cubic yards.
Masonry	5,200 cubic meters =	6,800 cubic yards.
"Platelage"	60 square meters =	650 square feet.
Iron work	7,000 kilograms =	15,450 pounds.
Gates	36 square meters =	387.5 square feet.

Pedro Miguel Dam.—The group of locks at this point is also to be accompanied with a dam for the closure of the Rio Grande Valley, which here again intercepts the canal. The formation not being favorable for the building of a masonry dam, an earth dam is contemplated. Its greatest height will be 9.75 meters (31.99 feet) from water elevation; its length at top will be 389 meters (1,276.26 feet). The greatest portion will have only an inconsiderable height.

This dam is to be built to the right of the canal; to the left, in the rocky cut of the Panama Railroad, the location of which is to be changed, a masonry spillway, 47 meters (154.2 feet) long at top, will be placed.

The estimated quantities for these structures are:

	Cubic meters.	Cubic yards.
Excavation	47,950	62,750
Embankment	111,900	146,400
Masonry	690	910
Riprap	7,500	9,850

Miraflores Dam.—The Miraflores lock is connected with a dam closing again a low part of the Rio Grande Valley. It is to be a small masonry structure of a total height at water level not exceeding 5 meters (16.40) feet; its top length will be 96.5 meters (316.6 feet).

Estimated quantities:

	Cubic meters.	Cubic yards.
Excavation	860	1,125
Masonry	1,000	1,310

ARTICLE 8.

FEEDING SYSTEM AND APPURTENANCES.

As stated in chapter 1 of this report, the method for feeding the canal adopted and herein described consists of a derivation of the Chagres from a high point in the valley at Alhajuela, where a dam is to be erected. A reservoir will thus be formed which will be in communication with the summit level of the canal by means of a supply channel to be built on the sidehills along the left side of the valley.

The structures required by the feeding system are:

First. The retaining dam at Alhajuela.

Second. The supply channel from the dam to the summit level.

Alhajuela Dam.—The object of the contemplated dam is not merely to raise the level of the Chagres to a point high enough for supplying the connecting channel; it is farther reaching, and, as stated in chapter 1, includes the formation of a large reservoir lake, in which shall be impounded, besides the water necessary for feeding the canal and for the motive power required for its operation during the periods of scarcity of water in the river, which may last three months, a portion of the maximum output of the freshets, so calculated as to allow the flow in the lower valley of those volumes only which are not considered excessive for the proper regulation of the river.

The dam is to be located at a narrow and favorable point of the Chagres valley, nearly 15 kilometers (9.32 miles) in a straight line from the place where the river first meets the line of the canal (P. K. 45). There we find a compact rock formation, the greatest depth of which is about 9 meters (29.53 feet) below the low-water mark of the Chagres, which is at elevation 28.4 (93.18 feet).

The lake to be formed by this dam, with a flow line at elevation 61 (200.13 feet), has an area which the surveys show to be 2,300 hectares (5,690 acres).

The water surface in the feeding channel at the start is at elevation 58 (190.29 feet), and this compared with elevation 31.25 (102.53 feet), maximum elevation of the water surface in the upper level gives a fall of 16.75 meters (54.95 feet) for a length of about 15.5 kilometers (9.63 miles). The reserve to be stored up for the feeding of the canal and for the production of power, as well as to make good the natural loss in the lake itself during the period of scarcity of the Chagres, is estimated to be 130,000,000 cubic meters (4,600,000,000 cubic feet); this reserve would require a layer 5 meters (16.4 feet) high from elevation 58 (190.29 feet), which leads to elevation 63 (206.69 feet).

Above this last elevation must be stored up 100,000,000 cubic meters (3,532,000,000 cubic feet) to be diverted from the freshets, according to the provisions made for their regulation, which will require another layer 4 meters (13.12 feet) high and leads to maximum elevation 67 (219.82 feet) for the water surface in the lake.

The top of the wall is established at elevation 69 (226.38 feet), and it is besides surmounted with a parapet 1 meter (3.28 feet) high. Low water in the Chagres being there at elevation 28.4 (93.18 feet), the depth of water impounded will be about 39 meters (127.95 feet).

The lowest point of the foundations being at about elevation 19 (62.34 feet), the greatest height of the dam will be about 50 meters (161.04 feet) above the foundations; its top length will be 285.5 meters (936.69 feet).

This structure is expected to be built entirely of concrete masonry. Its section was calculated according to the best rules followed to-day in such a manner that the maximum pressure will not exceed 6.5 kilograms per square centimeter (92.45 pounds per square inch), which is very reasonable.

In connection with this structure a spillway is to be excavated in the plateau at elevation 75 (246.07 feet), which crowns the rocky knoll forming on the left bank of the Chagres one of the abutments of the dam.

The drawings give all the necessary indications for the intended disposition of these structures.

Moreover, the minutes of the sixty-ninth and ninety-fifth meetings of the engineering commission completely relate the means adopted for the mode of execution. We will only repeat here that, in order to render easily accessible the section of country to be occupied by the dam, its appurtenances, and the feeding channel, a railroad is expected to be built between Obispo and Alhajuela.

The time required for the building of the Alhajuela Dam has been, according to data presented at the meetings above referred to, estimated at five years.

Estimated quantities for Alhajuela Dam.

	Cubic meters.	Cubic yards.
Earth excavation.....	51,400	67,250
Rock excavation.....	18,900	24,700
Masonry.....	150,000	196,200

The execution of this dam will require the excavation of a tunnel of "derivation" for the waters of the Chagres, and of a temporary dam to throw the waters in that tunnel, which will be 300 meters (984.26 feet) long and will have a section of 77 square meters (828.84 square feet).

The spillway is to be dug entirely in the rock. It will have a clear length of 50 meters (164.04 feet), allowing an overflow of 700 cubic meters (24,700 cubic feet) per second, and will be provided with metallic gates of the same type as adopted at Bohio. The sill of those gates will be at elevation 59 (193.57 feet) and the top at elevation 63 (206.69 feet).

The building of this spillway will require quite an amount of rock excavation, which may, however, be utilized in great part for the masonry of the dam.

The estimated quantities for the spillway are as follows:

Rock excavation.....	109,200 cubic meters	=142,850 cubic yards.
Masonry.....	450 cubic meters	=590 cubic yards.
"Platelage".....	150 square meters	=1,620 square feet.
Gates.....	210 square meters	=2,260 square feet.
Iron work.....	80,000 kilograms	=176,370 pounds.

Feeding channel.—The channel is designed to supply at the outset 25 cubic meters (890 cubic feet) per second. The plans are such that it will be possible to increase this supply by 10 cubic meters (350 cubic feet) by allowing the water to rise 0.5 meter (1.64 feet) higher, which can be done by raising the lip of the overflow openings provided at intervals over the whole length of the channel.

The surface of the water at the intake is established at elevation 58 (190.29 feet); it is the minimum flow-line of the Alhajuela reservoir.

The territory traversed by the location of the channel is divided into three very distinct portions with regard to the general lay of the ground.

The first portion of the channel, that between the intake at Alhajuela and the Chilibre Valley, covers a length of about 3.5 kilometers (2.17 miles); it is generally a kind of rocky plateau, cut up by several very tortuous rios, forming steep ravines. It would be very difficult and expensive to attempt in this region to excavate the channel on the side hills by following the meanderings of these rios. The solution arrived at and which leads to structures of simple character, consists in directly crossing the plateau while keeping near its edge on the side of the Chagres Valley, and in damming up, as we proceed, the ravines which cut it up, thus forming little lakes through which the channel will cross these ravines. The parts of the plateau too high above the channel bottom will be tunneled. The total length of the tunnels in this region which extends to P. K. 3.5, is 595 meters (1,952.12 feet). The dams, all built in masonry upon rock found at very shallow depths, with some retaining walls at a few secondary depressions, will require together 8,500 cubic meters (11,120 cubic yards) of masonry.

The intended railroad follows closely the location of the channel, and it will only be necessary to build a few short Decauville branches to give access to the works.

The second section of the channel includes the crossing of the valley of the Chilibre, an important affluent of the Chagres, and of the Juan Mina, a secondary affluent near the former. Between the ends of that section the channel is, on an air line, about 3,150 meters (10,350 feet) long.

The section is located in a large depression very much lower than the elevation of the channel bottom if it were continued at its normal level across the valley. The most rational, and at the same time the most economical, plan appears to be to cross that valley by an inverted siphon composed of two parts, 1,400 (4,595 feet) and 610 meters (2,000 feet) long, respectively, connected with a section of open channel 1,140 meters (3,740 feet) long.

At the crossing of the Chilibre an important metallic structure will be built to support the siphon. The three pipes of which it is formed have, under the total available head, a flowing capacity of 25 cubic meters (890 cubic feet) per second. The structures for the support and shelter of the siphon are so designed as to allow, if necessary, of the laying of a fourth pipe, thus increasing the capacity to 33 (1,165 cubic feet) or 35 cubic meters (1,240 cubic feet) per second.

The third section of the supply channel, along the accidented slope of a continuous ridge nearly parallel to the Chagres, is located on the side hill. This slope is cut at several points by somewhat deep depressions, forming secondary thalwegs perpendicular to the general direction of the ridge. The plans adopted for the crossing of these depressions vary according to circumstances. In some cases the chasm is to be bridged by a flume; in others it appeared simpler and more economical to adopt the solution already applied to the first portion, which consists in damming the rio at the crossing of the supply channel and in forming a small lake. These works are nowhere of magnitude, and the conditions for the foundations are favorable in all cases.

The channel intersects, at several points of this section, high spurs which it would have been expensive and possibly dangerous to cross in open cuts; they are to be crossed by means of short tunnels. This section at its downstream terminus ends in a spur at elevation 75 (246.07 feet), which separates the secondary valley of Rio Gamboa from the valley of the other rio flowing into the summit level of the canal. There is no other way of crossing this spur than by a tunnel which will be 430 meters (1,410.77 feet) long.

The location just described, prepared for the scheme with the bottom elevation of the summit level at 29.5 (96.79 feet), applies as well to the plan with the summit at elevation 20.75 (68.08 feet), for which it was thought best to preserve the same general features of the channel. In fact, if it were desired to lower the elevation of the outlet, it would be necessary to greatly lengthen the last tunnel, without realizing a material saving anywhere else on the route of the channel, or simplifying any of the structures; on the contrary, by allowing it to end at the same elevation, we can command a 9 meters (29.53 feet) fall, thus creating a source of power without additional expense.

SPECIAL TECHNICAL CONDITIONS.

The feeding or supply channel includes four kinds of work, namely:

First. Excavation for the channel.

Second. Retaining walls and masonry dams.

Third. Earth levees and dams.

Fourth. Various other structures.

Excavation and cross section of the channel.—Almost everywhere the channel is in a cut, so that it will be naturally as water-tight as possible; only at the rio crossings and at some points where it was economical to simply follow the side hills it was found necessary to build dams and side walls, which, however, are generally of small magnitude.

The total length of the channel is 15,250 meters (9.48 miles) between Alhajuela Lake and the regulating dam at the lower end, from which it will empty into a basin, forming, as it were, an estuary into the summit level.

The bottom of the channel at the start is at elevation 55.5 (182.09 feet); its slope is regularly 0.8 meter per kilometer (4.224 feet per mile) in the portions where the sides are of earth or of rock not paved, and of 0.6 meter per kilometer (3.168 feet per mile) in the tunnels and the flumes. The slope was also reduced to 0.6 meter per kilometer (3.168 feet per mile) in the open channel between the two siphons of the Chilibre Valley. The bottom of the channel at its lower end is at elevation 38.78 (127.23 feet). Beyond that point the channel formed by the upper level is at about elevation 37 (121.39 feet). The plan of the channel is a series of tangents and curves, the radii of which are not less than 60 meters (196.85 feet).

The cross sections of the channel are of two kinds for the portion in open cut. The engineering commission particularly discussed, at its ninety-first meeting, the question of cross sections, which have been computed by means of the latest Bazin formula, which insures a flow of at least 25 cubic meters (890 cubic feet) per second. Besides, an extra height of one meter of water is arranged for, which would increase

the supply to at least 40 cubic meters (1,400 cubic feet) if necessary. The channel is therefore well able to meet any possible present and future requirement.

Retaining walls and masonry dams; also earthen levees and dams.—Where the channel has to cross a rio or a depression not exceeding 5 (16.4 feet) or 6 (19.69 feet) meters below the normal water elevation, a lateral dam is provided to replace the omitted side walls. These dams are masonry walls at points where they can be built on rock foundation without incurring too great an expense. This is notably the case between the inlet of the canal and the Chilibre Valley. They are of earth at other points.

The masonry dams are twenty-eight in number, with a total quantity of 29,000 cubic meters (38,000 cubic yards) of masonry; they are of concrete masonry, and their section is calculated from the usual rules. In these structures spillways are provided of a size sufficient for the easy exit of the waters brought in by the dammed rios and quebradas, as well as by the flow from the side hills.

The number of earth dams is sixteen, of a total approximate volume of 10,000 cubic meters (13,100 cubic yards); they contain 1,400 cubic meters (1,850 cubic yards) of puddled work. Like the masonry dams, they are so designed as to be perfectly secure.

At the outlet of the first siphon into the Chilibre Valley, the natural ground being at a lower elevation than that of the channel bottom, an earthen levee 230 meters (755 feet) long, with a height of from 0 to 5.7 meters (18.7 feet), is to be built. The whole of the wetted prisms will be entirely covered with clay puddle 0.6 meter (1.97 feet) thick. The estimated quantities in this levee are:

	Cubic meters.	Cubic yards.
Earth	62,000	81,110
Clay puddle	7,000	9,156

Various other structures.—The other structures include 2 inverted siphons, 2 bridge flumes, 1 bridge over the Rio Chilibre, and 3 smaller ones, to be located either in the Chilibre Valley or at the crossing of the Rio Juan Mina.

Each siphon is formed of 3 sheet-steel pipes 2.4 meters (7.87 feet) diameter, placed side by side, with intervening spaces of 0.5 meter (1.64 feet) for repairs. The heads of these pipes are inserted in masonry dams, and are each fitted with a gate, in view of independent service. There are waste gates at the lowest point of each pipe.

The length of the first siphon is 1,400 meters (4,600 feet), with a loss of head of 5.24 meters (17.19 feet). The radius of the pipes being 1.2 meters (3.94 feet), their aggregate flowing capacity, according to the method of calculation generally used in the department of the Paris water works, is 26.09 cubic meters (921.39 cubic feet).

The length of the second siphon is 610 meters (2,001 feet), with a loss of head of 2 meters (6.56 feet), and an aggregate flowing capacity of 29.16 cubic meters (1,029.81 cubic feet).

The necessary supply is consequently well insured. Moreover, the substructure, as previously stated, is ample enough to accommodate a fourth pipe.

The siphons rest upon concrete foundations by means of intervening cast-iron shoes.

At the crossing of streams culverts are provided for the flow thereof. Two flumes bridge the Rio Falupa (P. K. 9.128) and the Rio Falupita (P. K. 10.1), respectively, and present a section sufficient for the supply.

Tunnels.—In order to avoid expensive detours, which the location of the channel over very steep sidehills would have required, 14 small tunnels are contemplated, with a total length of 1,555 meters (5,101.75 feet). The wetted part of these tunnels is to be lined. The upper part may also be lined if necessary.

The cross section of these tunnels is calculated by M. Bazin's formula and will largely meet all wants.

Means of access to the works.—In order to execute the various works just explained, storage yards for materials will be provided at convenient points near the branch railroad from Gamboa to Alhajuela; then from these yards to the works, Decauville narrow-gauge branches will be built to facilitate the necessary handling of materials at the works.

These branches will have a total length of about 5,000 meters (16,400 feet).

The following table is a summary of the estimated quantities for the proposed feeding channel:

General excavation:

Earth	232,000 cu. met. = 303,500 cu. yds.
Rock	386,000 cu. met. = 505,000 cu. yds.

Earthen levees and dams between the siphons:

Embankment.....	72,000 cu. met. = 94,200 cu. yds.
Clay puddle.....	8,400 cu. met. = 11,000 cu. yds.
Various tunnels (length).....	1,555 met. = 5,101.75 ft.
Dams and masonry walls of concrete masonry ..	29,000 cu. met. = 38,000 cu. yds.
Siphons in Chilibre Valley, with three pipes, foundation, and covering	2,010 lin. met. = 6,660 ft.
Metallic trestle supporting the siphon over the Chilibre.....	45 lin. met. = 148 ft.
Bridge flume over the Faluppa and the Falupita ..	90 lin. met. = 295 ft.
Branches of Decauville Railroad to give access to the several works.....	5,000 lin. met. = 16,405 ft.

ARTICLE 9.**UPPER CHAGRES RAILROAD.**

The railroad contemplated to facilitate the access to the whole region, including the supply channel and the Alhajuela Dam, starts near Gamboa from a branch connected with the Panama Railroad and already built along the central cut of the canal. Its terminus will be the plateau which, at elevation 75 (246.07 feet), commands the site of the Alhajuela Dam, and upon which will be built the houses for the laborers and all other necessary buildings and appliances.

The location of this road, a plan and profile of which have been made, was studied so as to bring it close to all the points of the channel where structures require the incoming of materials. The cross sections show that it will be built over ground having easy transverse slopes. The earthworks required will not be large. It will be easy to build close to the road laborers' camps and other buildings required by the contractors and for the storage of materials.

The gauge of this branch road will be the standard of the Panama Railroad. The minimum radius of the curves is 150 meters (492.13 feet). Its length is 16.2 kilometers (10.07 miles).

An estimate of quantities is as follows:

Excavation:	
Earth.....	125,500 cubic meters = 164,150 cubic yards
Rock.....	32,000 cubic meters = 41,900 cubic yards
Embankment:	
From excavation.....	157,500 cubic meters = 206,010 cubic yards
Borrowed.....	12,800 cubic meters = 16,750 cubic yards
Excavation for foundations of structures	3,900 cubic meters = 5,100 cubic yards
Masonry, total.....	8,630 cubic meters = 11,290 cubic yards
Metallic trestle over La Faluppa and La Falupita.....	33 meters = 102.27 feet
Metallic trestle over Chilibre.....	43 meters = 141.08 feet
Metallic trestles over minor openings...	103 meters = 337.93 feet

The building of this branch road is estimated to require two years.

ARTICLE 10.**DISPOSITIONS ADOPTED FOR THE REGULATION OF THE FRESHETS OF THE CHAGRES.
"DERIVATIONS," WIDENINGS.**

The general features of the plan adopted for the disposition of the freshets of the Chagres were indicated in chapter 1 of this report. They consist mainly:

First. In providing for the free flow during the period of maximum flood of an amount of at least 1,200 cubic meters (42,380 cubic feet) per second through the Bohio spillways and through special channels to the right and left of the canal.

Second. In retaining the surplus of the floods, which is estimated in the most unfavorable cases to be 250,000,000 cubic meters (8,829,000,000 cubic feet), in the Bohio Lake to an amount of 150,000,000 cubic meters (5,297,000,000 cubic feet), and in the Alhajuela Lake to an amount of 100,000,000 cubic meters (3,532,000,000 cubic feet), the amount so impounded to be gradually released at the time of the subsidence of the floods.

There remains only to indicate the special arrangements adopted to meet these conditions.

Two spillways are provided at Bohio, one with a 54-meter (177.17 feet) opening on the left of the canal and with an estimated overflowing capacity of 500 cubic meters (17,700 cubic feet) per second, the other with a 78-meter (255.91 feet) opening on the right at the Rio Gigante gap, with an estimated overflowing capacity of 700 cubic

meters (34,700 cubic feet) per second. These spillways are provided with movable gates 3 meters (9.84 feet) high, the sills of which are at elevation 14 (45.93 feet) and the top at elevation 17 (55.77 feet) when they are completely lowered. Generally the gates will remain lowered so as to maintain the water in the lake at elevation 17 (55.77 feet).

When a freshet shall occur the gates will be gradually raised, always maintaining that constant elevation, while allowing the flow of all the incoming water until the gates, being completely raised 3 meters (9.84 feet), the output of 1,200 cubic meters (42,380 cubic feet) per second will be reached; the total length of the spillways is calculated with that end in view. From that moment, should the freshet continue and the overflow become greater than 1,200 cubic meters (42,380 cubic feet) per second, the gates would be gradually lowered so as to limit to that amount the quantity issuing through the openings, and the surplus would naturally be impounded in the lake, raising its surface about elevation 17 (55.77 feet). It may happen that the water may progressively reach elevation 20 (65.62 feet) if the freshet is very large; at that moment the gates shall have been completely lowered, their top being brought back to elevation 17 (55.77 feet), and the output of 1,200 cubic meters (42,380 cubic feet) per second will flow over the top under a 3-meter (9.84 feet) head; the length of the spillways is so calculated as to allow the flow of 1,200 cubic meters (42,380 cubic feet) per second under that head.

The storage of 150,000,000 cubic meters (5,297,000,000 cubic feet) will thus be obtained.

Similar arrangements are provided at the Alhajuela spillway for the impounding of 100,000,000 cubic meters (3,532,000,000 cubic feet) and a free maximum flow of 700 cubic meters (24,700 cubic feet) per second. It was, in fact, calculated from the data at hand that this amount, together with the volume naturally furnished to Lake Bohio by the watershed below Alhajuela, will give a total maximum flow (inflow) of 2,000 cubic meters (70,600 cubic feet) per second, out of which 1,200 cubic meters (42,380 cubic feet) being freely allowed passage through the Bohio spillways, 800 (28,250 cubic feet) will be retained and form during the period of at most forty-eight hours, corresponding to the passage of a dangerous flood, the volume of 150,000,000 cubic meters (5,297,000,000 cubic feet) to be impounded.

To take care of 1,200 cubic meters (42,380 cubic feet) per second issuing from the Bohio spillways, "derivations" are provided to the left and right of the canal. These "derivations" were made in great part by the old company; they are merely to be repaired and completed. They are completely isolated from the canal, and levees will be built at such places where they will be deemed necessary to shelter the canal from any eventual intrusion of the waters carried in the "derivations." In case the output of 1,200 cubic meters (42,380 cubic feet) which they are to accommodate would be accidentally overstepped, the flow of the surplus will take place in the main bed situated between the "derivations" and the protecting levees of the canal.

Widenings.—Lake Bohio contains some narrow and tortuous portions which the width of the canal would nearly fill. Unless those parts are widened, currents dangerous to navigation might result. These narrow places are to be so straightened and widened that the possible flow at the time of the maximum inflow will not exceed an average velocity of 1 meter (3.28 feet) per second.

ARTICLE 11.

CHANGE OF LOCATION OF THE PANAMA RAILROAD.

The present railroad across the isthmus intersects the line of the canal in two places. It does not seem admissible to allow a railroad to cross so important a canal on account of the impediments which might result for navigation. Moreover the elevation of the water in Lake Bohio, which is a part of the plans considered, is at places higher than the railroad track, which would thus be submerged. For these two reasons it is necessary to relocate the railroad and to keep it to the left of the canal, where it is now situated at its starting point at Colon and at its terminus at Panama. This change will begin a little below the site of the Bohio Dam and terminate at Miraflores, where it will meet again and follow the actual location. The final surveys for this change of location are not yet made; a preliminary location only has been made which permits to approximately estimate the required expense at 250,000 francs (\$48,250) per kilometer. The total length of the new location will be about 50 kilometers (31 miles).

ARTICLE 12.

GENERAL EXPENSE.

The cost of the plan just described has been estimated carefully and in detail for all kinds of work. The estimate for excavations was established from calculations

based upon numerous cross-sections made especially for that purpose, and for the various structures from complete drawings. The details may, at the time of actual execution, be more or less modified, but the estimated expense would not be practically changed thereby, but the unit prices adopted in our estimate would be perceptibly modified by probable improvements in the means of execution. We can therefore expect that such modifications would reduce the estimates, as the unit prices adopted are large.

The general cost is summed up as follows:

General excavation.

	Francs.	Dollars.
Maritime Atlantic level.....	20,568,000	8,969,700
Bohio level	33,225,000	6,412,500
Summit level	118,675,000	22,904,300
Paraiso level.....	6,363,000	1,228,100
Pedro-Miguel level	4,781,000	922,700
Maritime Pacific level	30,387,000	5,864,700
Contingencies	21,000,000	4,053,000
Total	235,000,000	45,355,000
Revetment of the canal	7,000,000	1,351,000
General cost of excavating canal	242,000,000	46,706,000

The average prices adopted, including labor and disposal of materials, are, for dredging, 3 francs (\$0.579) and, exceptionally, 3.5 francs (\$0.6755) per cubic meter for ordinary excavation, and 5.5 francs (\$1.0615) per cubic meter for the removal of rocky materials.

For the big trench and other dry excavation, they are 3.5 francs (\$0.6755) for ordinary excavation and 5.5 francs (\$1.0615) for rocky excavation, including all labor and disposal of materials.

These unit prices were established from the actual cost of the large central cut, with corrections which appear to be justified by expected future conditions.

Locks.

	Francs.	Dollars.
Double step of twin locks at Bohio	32,216,000	6,217,700
Double step of twin locks at Obispo.....	29,928,000	5,776,100
Paraiso twin locks	15,945,000	3,077,400
Double step of twin locks at Pedro Miguel.....	28,851,000	5,568,300
Miraflores twin lock.....	15,799,000	3,049,200
Timber approaches of locks and operating machinery.....	1,675,000	323,300
Contingencies	12,588,000	2,420,100
General expense for locks	137,000,000	26,461,100

The price for masonry has been determined by a careful analysis of quantities and established as 50 francs (\$9.65) per cubic meter.

Dams and spillways.

	Francs.	Dollars.
Bohio dam and spillways, including temporary structures	10,981,000	2,119,300
Obispo spillway dam	451,700	87,200
Paraiso dam and spillway	1,848,700	260,300
Pedro-Miguel dam and spillway	896,900	173,100
Miraflores dam and spillway	50,200	9,700
Alhajuela dam and spillway, including temporary structures	12,210,700	2,356,700
Contingencies	4,060,800	783,700
General expense for dams	30,000,000	5,790,000

The masonry prices are the same as for the locks, as regards the dams along the canal, and are raised to 60 francs (\$11.58) for the Alhajuela Dam.

"Derivations" and widenings.

	Francs.	Dollars.
"Derivation" to the left of canal	5,547,000	1,070,600
"Derivation" to right of canal	5,550,000	1,071,200
Widening at various points of Lake Bohio	3,298,700	636,600
Contingencies	1,604,300	309,600
General expense for "derivations" and widenings	16,000,000	3,088,000

Railroads.

	Francs.	Dollars.
Change of location of Panama R. R.	14,000,000	2,702,000
Higher Chagres R. R.	1,617,000	312,100
Contingencies	383,000	73,900
General expense for railroads	16,000,000	3,088,000

Feeding channel.

	Francs.	Dollars.
Estimated expense	15,000,200	2,895,000
Contingencies	1,999,800	389,000
General expense for the channel	17,000,000	3,281,000
Estimated cost of right of way	6,000,000	1,158,000
Estimated expense for power plants	13,000,000	2,509,000
The aggregate of the expense above summarized represents a total of	477,000,000	92,081,100
Contingencies on account of unforeseen structures, the need of which may develop during construction, in addition to the sums (nearly 42,000,000) (\$8,100,000) already estimated for the rest of the work	35,000,000	6,755,000
Total execution of canal and appertaining work	512,000,000	98,836,100

This amount would be diminished by about 40,000,000 francs (\$7,720,000) if the building of a second chamber in all the locks were temporarily postponed.

The amount of 512,000,000 francs (\$98,836,100) would be raised to 525,000,000 francs (\$101,325,000) if both chambers, with a width of 25 meters (82.02 feet) each, were built at the start for each lock.

Dated Paris, November 16, 1898.

A. ROBAGLIA,
President Engineering Commission.

HENRY L. ABBOTT.

E. CASTEL.

V. DAYMARD.

FARGUE.

A. FTELEY.

FULSCHER.

HERSENT.

W. HENRY HUNTER.

KOCH.

JULES MARTIN.

C. SKALKOWSKI.

NICARAGUA CANAL.

MARITIME CANAL COMPANY.

Hearing continued before the Committee on Interstate and Foreign Commerce of the House of Representatives, Thursday, January 19, 1899.

The committee met at 10.30 o'clock a. m., Hon. William P. Hepburn in the chair.

STATEMENT OF ALEXANDER T. MASON, ESQ., REPRESENTING THE MARITIME CANAL COMPANY.

Mr. MASON said: Mr. Chairman and gentlemen of the committee, I am the counsel for the Maritime Canal Company of Nicaragua. I have been requested by the officers of the Maritime Canal Company to make a few remarks in reference to the concessions and then to answer such questions as the committee may desire to put and to give the committee such information as may be within my power.

I desire at the outset to call the committee's attention to the Costa Rican concession. The Nicaraguan concession was obtained in 1887. At that time the treaty of limits between Costa Rica and Nicaragua was undergoing litigation, had been submitted to President Cleveland under an arbitration agreement, and was awaiting his award. The treaty of limits was a treaty made in 1858 between Nicaragua and Costa Rica, shortly after the Walker filibustering expedition which resulted in the establishment of the Walker government. Costa Rica then assisted Nicaragua in ousting Walker and recovering control of the country, and insisted as a reward for those services that a treaty should be enacted definitely locating the boundary line between the two republics, which up to that time had been in dispute.

This treaty in 1858 was passed and was ratified. The Government of Nicaragua never raised any question about it for a number of years. The concession to Mr. Felix Belly for the construction of a canal was granted in 1859, a year after the treaty of limits was made, and the consent of Costa Rica was obtained for that.

In 1868 a concession was granted to a gentleman who represented the French Government, and the consent of Costa Rica was obtained for that. It was not until the concession that was granted in 1880, known as the Grant & Ward Nicaragua Canal concession, which was a concession that came into the hands of Grant & Ward in New York, in which President Grant was interested, that a concession was granted without the consent of Costa Rica.

The CHAIRMAN. Would it interrupt you if I were to ask you a question there?

Mr. MASON. No, sir; I should like to be asked any questions.

The CHAIRMAN. What was the boundary; where were the limits established?

Mr. MASON. The limits as finally established by the treaty of limits, and subsequently confirmed by the award of President Cleveland, starts at Salinas Bay. It runs back to a point distant 2 or 3 miles—I am not quite sure which—from the lake, circles the lake at a distance of 2 or 3 miles, near the river [indicating on map], and then runs down the same distance away from the river until it reaches a point 3 miles below Castillo Viejo, which is represented there on the map [indicating on map]. From Castillo Viejo down the river to this point [indicating on map] it owns the right bank of the San Juan River.

The CHAIRMAN. Costa Rica does?

Mr. MASON. Yes, sir; Costa Rica. In addition to that the treaty of limit gave to Costa Rica the perpetual right of free navigation, free use of the waters of the San Juan River. It also gave to her the right of navigation and common rights over the part of San Juan Del Norte which is situated here [indicating on map], and which was the Atlantic port and terminal of the canal.

After the granting of this Grant & Ward concession, or what is known as the canal cession of 1880, when this question was raised it was finally referred to President Cleveland under the arbitration agreement, and I think it was in March, 1888, that President Cleveland handed down his award, in which he sustained the position of Costa Rica, the claims of Costa Rica under the treaty of limits, and clearly defined her proprietary rights in these waters and over this land.

The CHAIRMAN. Allow me to ask you a question there. In that portion where the San Juan River is the boundary was the middle of the channel made the boundary, or was the right bank of the river made the boundary of Nicaragua?

Mr. MASON. The right bank of the river, sir, with perpetual rights of navigation over the waters of the San Juan, Nicaragua agreeing not to divert the waters in any way to interfere or to interrupt that free navigation.

The CHAIRMAN. So that Costa Rica has no right except the right of navigation in the river? Her rights did not extend to the middle of the channel, as is usually the case?

Mr. MASON. No, sir; the right of sovereignty over the bed of the river remained in Nicaragua, but Costa Rica owned absolutely in fee the right to the bank of the river and all the land lying on the other side of the river—the Costa Rican side—and also owned these perpetual rights over the river itself.

Shortly after we had obtained this concession from Nicaragua, Costa Rica filed her protest. She started first to say that nobody should land in the port of San Juan to commence surveys or anything else, but finally, by mutual agreement, it was decided to take the question up and negotiate some sort of an agreement with her, and she consented to allow our surveying parties to commence their work. We then addressed to Nicaragua a statement setting forth the claims of Costa Rica—the fact that Nicaragua had agreed to give us, under her concession, the entire right of way down the San Juan Valley for the canal, and that she had failed to comply with the terms of her contract. She notified us that there was established what is known as the Soto ——— treaty. This was a treaty that Soto and ———, of Costa Rica, negotiated for the purpose of deciding this question.

The treaty, as far as the Nicaragua Canal concession was concerned, ratified and approved the Nicaragua Canal concession in behalf of Costa Rica. The treaty would have settled all difficulties and would have paved the way for work on the canal without any further negotia-

tions. It was promptly ratified by the Congress of Costa Rica, but although it had been negotiated by Nicaragua in the first instance, when it reached the Congress of Nicaragua it was defeated. We were then notified by Nicaragua that the Soto treaty having failed, it behooved us to get out of this difficulty the best we could. So we commenced negotiations with Costa Rica, which were commenced here in Washington with the minister, and lasted for a period of six months or more, during which time we were unable, practically, to do anything more than preliminary surveys down there, and finally it resulted in the Costa Rican concession, known as the Cardenas-Menocal concession. That concession is still in force. It grants an exclusive privilege for ninety-nine years, subject only to such provisions in the way of forfeiture as the concession itself contains. The ten year period which that concession contains will not expire until February 9, 1901, so that the Costa Rican concession, which this company owns to-day, even if this were a question of forfeiture under the ten-year limit, which question has been raised, would not be subject to forfeiture until February 9, 1901.

Mr. BARHAM. How do you make that out?

Mr. MASON. Because the concession was granted on the 9th day of August, I think it was, 1889 [referring to a memorandum]. It was ratified and approved August 9, 1888. The concession grants a period of two years and a half to the company within which to make the preliminary surveys, organize the company, and make the final axial surveys, locating the line of the canal, and then an additional period of ten years in which to complete the construction of the canal. That would carry it until 1901, as I have calculated it. This Costa Rican concession now, with the Nicaraguan concession we have, completes the company's title absolutely to the entire line of the canal from ocean to ocean and puts us in a position to locate it wherever we please, selecting any route, as both concessions are broad enough to permit the selection of any route which the company may deem to be the best.

Now, I wish to say a few words with reference to the question of forfeiture that was raised. The gentleman asked this morning what the company had to say with reference to the question of forfeiture which had been raised.

Mr. BARHAM. By legislative construction of Nicaragua it seems they have declared a forfeiture to take place on the 9th of October of this year.

Mr. MASON. Yes, sir. Article 5 of the Nicaraguan concession held by the Maritime Canal Company provides that the state binds itself not to make any subsequent concession for the opening of a canal between the two oceans during the present concession. Yesterday I had the pleasure of listening to the remarks of one of the gentlemen who spoke, and upon questions asked him by some of the members of the committee he drew this distinction: That while that was the provision which prevented and prohibited Nicaragua from granting any concession which would take effect during the life of this concession, that it did not prohibit Nicaragua from granting one during the life of this concession which would take effect after its expiration.

Apart from the question as to whether or not the granting of a concession to-day, which ipso facto takes effect at a subsequent date, is not the granting of a concession within the meaning of the gentleman's construction, which I think it clearly is, I would call your attention to the phraseology of this provision in article 5.

The State binds itself not to make any subsequent concession during the term of the present concession.

In other words, the State binds itself that during the present concession—the life of this concession—it will not make any concession which is to follow this concession. It will not make any subsequent concession for the opening of a canal.

The CHAIRMAN. Let me ask you a question there, if you please. Was that concession originally in the Spanish language?

Mr. MASON. The one I am reading from?

The CHAIRMAN. Yes, sir.

Mr. MASON. Yes, sir.

The CHAIRMAN. Then this is a translation of that?

Mr. MASON. Yes, sir; it is a translation.

The CHAIRMAN. Are you sure that the translation is complete, so that the word “subsequently” there has the precise meaning that it would have had if it had been in English in the first instance? What is the corresponding word to that?

Mr. MASON. Unfortunately I have not my Spanish copy of the concession with me, but I want to say that these concessions have been translated with the utmost care. Every word has been gone over. It was originally translated by some of the very best Spanish translators in New York. It has been down to Nicaragua, and has been read by Nicaraguan officials and by the Nicaraguan minister here, and they have all admitted that it is a very correct translation, and I will say of my own personal knowledge that I have been over almost every single provision between the original and English—while I am not a fluent Spanish scholar, and can not speak the language as well as I wish I could, I am able to read it—and that the translation is an accurate translation.

The whole object of that provision was, Mr. Chairman, that during the existence of this concession Nicaragua should not have the right to grant other concessions. If she had the right to grant a concession one year or two years before the terms contained in our own concession expired she would have had the right to have done it the year after she granted the original concession to us. So that the granting of a concession that in any way interferes with our concession is in violation of article 5, and a direct violation of one of the obligations which Nicaragua had undertaken.

Mr. HAWLEY. Do you interpret that gives you any advantage in your present concession, any renewal or lease of power or additional rights, simply because they have broken that part of the contract? What advantage do you think you acquire from that part of it?

Mr. MASON. I do not think I quite understand your question.

Mr. HAWLEY. It is material to this discussion as to whether the Nicaraguan Government has violated its contract with the Maritime Canal Company?

Mr. MASON. As far as the Maritime Canal Company is concerned?

Mr. HAWLEY. Yes, sir. Do you think any advantage is accruing thereby now?

Mr. BARHAM. How are you affected by this subsequent contract?

Mr. MASON. We are not affected by this subsequent contract. This provision I have been reading, article 5, does not affect this concession, which is in esse.

Mr. HAWLEY. What is the purpose of discussing that particular feature of the matter—that the Nicaraguan Government has contravened its own concession?

Mr. MASON. I was leading up to show that the Nicaraguan Government could not declare a forfeiture.

Mr. ADAMSON. We don't want to know whether that party will be your successor if you die. All we want to know is whether you are dying or not.

Mr. BARHAM. I think it is important to show, as has been apparently shown, that this does not expire until 1901.

Mr. MASON. Let me say at the outset that this term of ten years would not, under the very terms of the concession itself, expire until October 24, 1899. The term that Nicaragua has fixed in this subsequent concession is October 9, 1899.

Mr. MANN. Why do you say October 24?

Mr. MASON. Because April 24 was the date of the granting of the concession. A period of two and one-half years was given to do certain work, and then an additional ten years. So the date on which it would expire would be the twelve years and six months.

Mr. MANN. The ten years is not from the time you commenced work, then?

Mr. MASON. No, sir; it has given us absolutely ten years in which to construct it.

Mr. MANN. You commenced construction October 8, 1889.

Mr. MASON. That did not cut off our time. We might have commenced a year before that. It did not cut off the time period which was given to us by the concession at the time.

Mr. MANN. It is ten years from the time you commenced, isn't it? What is the wording of the concession?

Mr. MASON (reading from concession): "There is granted to the concessionary company a term, not exceeding one year, in which to commence the final surveys for the canal, and one year and one half additional for completing them, to organize the executing company, and commence the work of construction." Please note those last words—to organize and to commence the work of construction.

Then the next article, article 48, gives them a term of ten years for the construction, completion, and opening of the canal for maritime navigation.

Mr. MANN. That is, ten years from the time you commence; I suppose that is their claim, anyhow.

Mr. MASON. That very likely is their claim.

Now, Mr. Chairman, when this concession was obtained three things were provided for: First, to commence those surveys, and a period was fixed in which those were to be done; second, to complete those surveys, to organize a final company to which the concession shall be transferred, and to commence the work of construction, all of which was complied with, and, finally, a period of ten years within which to build it.

The company realized the task that was before them in floating this scheme and to construct it after they had completed the preliminary provisions, and for that reason there was inserted in the concession the clause contained in article 48, the last part of which article provides that "if at the end of the ten years aforesaid the work should not be completed so as to have the maritime communication between the two oceans opened, in consideration of the great capital the company may have invested in the enterprise and of the good will and ability it may have shown and the difficulties encountered, the Republic binds itself to concede a new extension."

Mr. HAWLEY. What section is that?

Mr. MASON. That is section 48.

Mr. BARHAM. Do you claim that the Maritime Canal Company of Nicaragua has the ability to build this canal now?

Mr. MASON. This concession does not provide that it shall have it at any particular time. It says "owing to the ability and good will it may have shown."

Mr. MANN. Do you think it has shown the ability and good will?

Mr. BARHAM. That means—the ability means—you have the money to build it with.

Mr. MASON. Suppose we raised it three months from now?

Mr. BARHAM. I am not talking about that. I am talking about the condition now.

Mr. MASON. Suppose—

Mr. BARHAM. No. Have you the money now? Are you in the condition now?

Mr. MASON. I should have to refer you to the officers of the company for that. I do not suppose it would be possible to build the canal to-day.

Mr. BARHAM. But have you the ability?

Mr. MASON. We may have the ability before the concession provides.

Mr. SHERMAN. There is no claim that you have the ability to-day to go on!

Mr. MASON. No. No claim has been made to that effect.

The CHAIRMAN. If it would not disturb you I would like to have your idea of what is meant by the language used there—"the great investment"—what is the language?

Mr. MASON. "The great capital the company may have invested."

The CHAIRMAN. Now, will you give your idea of their conception—the other party to the contract—of those words; what they understood by that, considering it at the time when you applied to them for an extension.

Mr. MASON. If you would like me to give what in the eyes of Nicaragua great capital would be, I would say that I think \$1,000,000 would seem to them an enormous sum. They have been using these concessions all along for raising paltry sums of money, and to have \$2,000,000 invested at once in Nicaragua with all the work that meant to Nicaragua's people, and the property that was sent down there, because Nicaragua was transformed when we began to spend this money down there; Graytown became a city, practically, and the expenditure of three or four millions with them did mean investing great capital in that enterprise.

They simply demanded from us \$100,000 guaranty, and, if through no fault of ours, but owing to the difficulties we have encountered, and to the obstacles which they have placed in our way, it has been impossible to complete the negotiations which this concession contemplates, namely the raising of the money, because that is all contemplated in the granting of the concession, then our concession is not ended. At the time she granted this concession Nicaragua did not think we had this money in the palm of our hands ready to put it down in Nicaragua that very instant. She knew we had to organize a company of execution; that we had got to go to work and raise this money, and she provides that we shall go throughout the entire world and raise it from the different countries, appealing to the people.

The CHAIRMAN. What would be your idea of great capital expended, in view of your having ten years to do the work, and then at the end of ten years possibly having a further concession; what would be your idea of great capital?

Mr. MASON. I consider that the expenditure of \$4,000,000 or \$5,000,000 down in Nicaragua is the expenditure of great capital.

The CHAIRMAN. Well, then, suppose you had a concession for ten years further, and would then expend \$5,000,000 of capital in that ten years. Would it then be competent for you to go and ask for a still further extension?

Mr. MASON. That would depend entirely, sir, upon the circumstances; upon what their action had been toward us; what obstacles they had placed in our way; what difficulties we had encountered through them.

I would like to call the committee's attention to some things that have transpired since this concession was obtained, in the way of difficulties and obstacles that have been thrown in our way, because this is material in this question. Whether or not we are entitled to this concession is a question of fact. It is a question of fact to be determined by somebody, not ex parte by Nicaragua. The concession expressly provides that if there is any question as to the interpretation of any article, or any question comes up, it shall be referred to arbitration and be decided by that board of arbitrators. Here is an absolute covenant on the part of Nicaragua to do certain things under certain circumstances, and it is a question of fact whether those circumstances have occurred and are sufficient to warrant us and to entitle us to the extension which we claim we are entitled to.

Now, in determining that, all these questions of difficulties encountered have to be taken into consideration.

It is merely a question under that article whether we have proceeded in good faith in this entire matter. That is all there is about it.

Mr. MANN. It is more a question whether you have proceeded at all.

Mr. MASON. Well, sir, the facts will show that the work has been done there—the history of what was accomplished during the first four years. I certainly think the expenditure of \$4,000,000 or \$5,000,000 down in Nicaragua was commencing work and doing a considerable amount of work.

Mr. BARHAM. Until you met with difficulties you had expended that amount of money, you claim?

Mr. MASON. The reason why more money has not been expended and why the company has not completed the canal has been that the difficulties have been such that it has been impossible to raise the money.

Mr. MANN. What are those difficulties that have been placed in your way by Nicaragua?

Mr. MASON. In the first place, the concession she granted did not give us what she claimed it did. A delay of nearly six months took place—

Mr. MANN. On its face it indicated what it did do?

Mr. MASON. On its face it did give us an absolute title to the whole route of the canal. It was not until the award of President came in under the Treaty of Limits of 1858 that we discovered we had not a good title from Nicaragua. She admitted herself that she had not given us a good title, and having tried to perfect that title by the Soto treaty, which failed, she then notified us to go to Costa Rica and complete our title ourselves.

Mr. MANN. That was before the supplement agreemental by which you agreed that the canal operations commenced on October 8, 1889?

Mr. MASON. Yes, sir; but it was all preliminary work.

Mr. MANN. What obstacles have there been since that time?

Mr. MASON. All these matters, beginning from the very inception of the scheme itself. They all tended to prevent the raising of money.

Mr. MANN. You had better get in the record what they were. That is what I would suggest.

Mr. MASON. I will state them. In the first place Nicaragua did not deliver the complete right of way to us, and a delay of six months or more was occasioned from Costa Rica—the Costa Rican concession. Immediately after we had obtained the Costa Rican concession Nicaragua protested against it and prohibited us from commencing work down there. We sent an expedition down there to commence work in June, 1889, and we were never allowed to proceed with that work officially until October 8, 1889. During all this time this litigation was going on, and Nicaragua then and there declared our concession forfeited unless we rescinded and annulled the Costa Rican concession, and it was only through the intervention of the United States that finally this tripart agreement was made, October 8, 1889, by which this was absolutely settled amicably, and we were permitted to proceed with the work.

Mr. MANN. Do you claim that any of those obstacles prior to October 8, 1889, would give you a right—

Mr. MASON. I would ask you—

Mr. MANN. Please don't ask me any questions. I simply ask you if you make that claim about this?

Mr. MASON. I claim this; that all these events which transpired so affected the financial world that it shook the confidence of everybody in Nicaragua. If a corporation is trying to float a loan of \$100,000,000 to build a canal, and right in the face of that the government granting the concession notifies the whole world at large that it intends to declare the concession null and void on a certain day, all proceedings in the way of financing the scheme fall to the ground. Now, we not only had that to contend with, but we were met by a suit, an injunction, issued by the Atlantic and Pacific Ship Canal Company, which was a corporation holding a concession from Nicaragua way back in 1849.

Mr. BARHAM. By what court was that?

Mr. MASON. The supreme court of New York.

Mr. BARHAM. An American court?

Mr. MASON. Yes, sir, proceeded against us.

Mr. MANN. That was not an obstacle thrown in your way by Nicaragua.

Mr. MASON. I am not confining myself to the obstacles thrown in our way by Nicaragua.

Mr. MANN. I thought you were going to enumerate the obstacles thrown in your way by Nicaragua?

Mr. MASON. Then we were met by the claim of Nicaragua that, in view of the Costa Rican concession the canal must be entirely located within Nicaraguan territory, so that not a foot of Costa Rican territory need be used in building the canal. We were notified to change the port from San Juan del Norte, and locate it at a town which they created and called America. The company had to proceed to answer that. It involved any amount of diplomatic correspondence and negotiation, and finally the matter was adjusted and placed out of the way. There have been I do not know how many revolutions and counter revolutions during the time of this concession.

Mr. MANN. You say you do not know how many. Will you tell the committee, by information in any way, how many there have been?

Mr. MASON. Well, sir, I think there have been three revolutions and one counter revolution, if I remember correctly, but there have been so many there that I would not like to limit it to that number. In fact, the revolutions occur so frequently—

Mr. BARHAM. Did that interrupt the construction of the canal?

Mr. MASON. It interrupted our work down there. They sunk our ships and took possession of them.

Mr. MANN. These incidents ought to be made very specific, because information of that sort is valuable, if you give facts.

Mr. MASON. If I were preparing a brief on this subject, as I should in case it was necessary to appear before a board of arbitrators, if this case should be referred to a board to determine whether or not we were entitled to an extension, I should enumerate every point very clearly. But I am giving you now such points as I have—

Mr. ADAMSON. We want to know all the facts. We want to know your case. We may want to try to sustain you, and to do that we should have all the facts.

Mr. MANN. You could not expect us to act on general statements. For instance, you say, "They sunk our ships." You would not want us to act on that unless you told us when and where they sunk your ships. So, too, you speak of revolutions, without specifying. You are not explicit.

Mr. BARHAM. I suppose the committee ought to take judicial notice, as a matter of history, of revolutions that have occurred there. Still the court, as a matter of fact, does not have that information.

Mr. ADAMSON. There may be two or three different parties wanting to write this history.

Mr. MASON. The history of Nicaragua, as far as revolutions are concerned, would be a very difficult one to write, and I must confess that with what information I have about it I am not prepared to write it. Nobody but somebody who has been on the ground could give you a detailed statement of what occurred there.

Mr. BARHAM. I suppose you could justify a court in presuming the presence of revolutions at all times there.

Mr. ADAMSON. If you can show that there have been so many revolutions there that you could not safely stay on the ground—

Mr. MASON. My point is this: That all these things taken together have made a condition of affairs there such that it has destroyed the confidence of the world at large in the ability of any corporation to build this canal and in the belief that only through Government action can it be built, and that, backed up by the action which the United States Government has taken, practically has made it impossible to finance this scheme throughout the world at large.

Mr. BARHAM. As to revolutions. Is there any difference in that country in that regard since you got that concession and prior to your getting that concession? Were not those revolutions going on before you got the concession?

Mr. MASON. No, sir; they had had a remarkably steady interregnum of peace.

Mr. MANN. Let me see if I understand you. You claim that you are entitled to the concessions, partly because the Government of Nicaragua has thrown obstacles in the way of your work.

Mr. MASON. Partly, yes, sir.

Mr. MANN. Yet those obstacles were not so much physical obstacles—none of which you have named—as they were the moral force which prevented you raising the money. Am I right?

Mr. MASON. Yes, sir. I do not claim that Nicaragua has interrupted us by main force.

Mr. MANN. Do you claim that Nicaragua has interrupted you by any other kind of force?

Mr. MASON. No, sir.

Mr. MANN. Has Nicaragua interrupted you at all?

Mr. MASON. Most assuredly. She has interrupted us in the proceeding with the canal by the various acts that she has done. She has destroyed confidence in the whole enterprise.

Mr. MANN. Well, of course that is a difference of meaning about the word interruption. I do not want to quibble about the word. The Government of Nicaragua has not stopped you?

Mr. MASON. Not since the first six months.

Mr. MANN. Not since October, 1889.

Mr. MASON. No, sir.

Mr. MANN. They have not interfered with you in any way, unless this new concession would be an interference?

Mr. MASON. In one instance. Article 20 provides that Nicaragua shall place us in possession of all the lands that are necessary lying between the lake and Brito—that are necessary for the canal—the Pacific coast, upon our paying to the Government of Nicaragua \$50,000 in cash. We paid Nicaragua \$50,000 in cash, and got her receipt for it. She never delivered the lands to us, and when we attempted to commence the work on that division of the land we were met by the owners, whose lands had not been expropriated by the Government, and who, through the judiciary proceedings of Nicaragua, prevented us from working in that locality.

Mr. MANN. That is a very important matter. I do not wish to take up your time if that has already been stated and the particulars given to any committee of the House or the Senate, but that is an important matter.

Mr. MASON. Not to my recollection; but I think that is in the reports.

Mr. MANN. Now, when was it you started to work on that end of the canal? (A pause.) Well, go ahead.

Mr. MASON. I have a lot of papers here. I can get that date out. We paid them \$50,000—

Mr. MANN. I understand the concession required them to purchase land—what we would call the right of eminent domain?

Mr. MASON. Yes, sir.

Mr. MANN. And you put up \$50,000 to cover that. Now, if they failed to carry out that part of the agreement, and thereby stopped you from carrying on the part of the work which you were prepared to do, it might be a very important matter.

Mr. MASON. They took the \$50,000, receipted for it, and we have never got the money up to to-day.

Mr. MANN. There was plenty of other ground, and if you really started to work there that might be a very important matter.

Mr. MASON. These lands under article 20 are the lands required for canal purposes.

Mr. MANN. I understand that.

Mr. MASON. So we could not have expropriated them.

Mr. MANN. Is there any other instance where the Republic of Nicaragua has directly interfered with you on the line of the canal; has interfered with the construction of the canal?

Mr. MASON. Not to my knowledge.

Mr. MANN. So far as you are informed, then, the only obstacle outside of this one instance is the obstacle thrown in the way of your raising money to carry on the canal?

Mr. MASON. Yes—

Mr. BARHAM. Destroying confidence—

Mr. MASON. And obstacles raised by the Government from time to time.

Mr. MANN. The only obstacle is in the way of your raising money?

Mr. MASON. Of financing the scheme; yes, sir.

Mr. MANN. Very well, and the only way they have done that is, as you have stated, by destroying confidence in the ability of a private corporation to carry on and construct this work?

Mr. MASON. And destroying confidence in the belief that they were going to carry out their contract in good faith, and the belief that if people put their money into the enterprise the Government would stand up to it.

Mr. MANN. Have you any instance where they have done any particular thing which would give people the idea that they would not carry out their contract in good faith?

Mr. BARHAM. When was the grant made to the Atlas Company?

Mr. MASON. A year ago—less than a year ago.

A BYSTANDER. Two years in May.

Mr. MASON. I have the concession here. Three years ago a question came up in relation to the Tipitapa Canal, the construction of which the company had agreed to complete. Nicaragua consented to place us in possession of the lands required to construct this canal, and also entered negotiations to obtain a canal of larger dimensions, so as to allow ships of larger draft to pass through.

Pending those negotiations an attempt was made to forfeit the concession for noncompletion of this work, and right in the midst of the negotiations which were then pending for the raising of a large portion of the capital of the company, Mr. José de Gamez, who was minister there, I think, wrote a letter notifying the company that Nicaragua had elected to forfeit the concession, and appointed two arbitrators and demanding from us the appointment of the other two, so the question as to whether or not the concession had been forfeited might be referred to that board of arbitration.

That letter, after four or five months I think it was—nearly that time, perhaps three months—was withdrawn at the instance of Secretary Gresham, who called the Nicaraguan Government's attention to the fact that it was an unwarranted procedure, and the letter was withdrawn by Nicaragua and the matter dropped. There was an instance—

Mr. BARHAM. That related to the portion of the concession under which you were operating?

Mr. MASON. Yes, sir.

The CHAIRMAN. Where was that canal located?

Mr. MASON. It was this little canal which runs between Lake Managua and Lake Nicaragua.

The CHAIRMAN. Under your concession you were required to build that?

Mr. MASON. Under our concession we agreed to build it, yes, sir.

Mr. MANN. Was it any advantage to you to build it?

Mr. MASON. No.

Mr. MANN. Why did you start to build it?

Mr. MASON. Because we were required to build it in a certain number of years.

Mr. MANN. And they interfered?

Mr. MASON. They never put us in possession of all the lands. They had to expropriate all those lands.

Mr. BARHAM. Did you try to take possession of the lands?

Mr. MASON. No, sir.

Mr. BARHAM. Through over to Brito, then?

Mr. MASON. Yes, sir. Some of the lands over here were owned by Mr. Gamez, to whom I have referred, who sent this letter when he was minister, and he ousted us from his land.

Mr. BARHAM. And would not permit you to go on?

Mr. MASON. No, sir; and they have never been expropriated. The lands were his. There was no question about that. Now, any one of these obstacles I do not claim prevented the construction of the canal, but what I do claim is that in reaching an interpretation of the article entitling us to a concession, all these facts must be taken into consideration in order to ascertain what difficulties, if any, we have encountered. The panic of 1893 certainly should be taken into consideration.

Mr. MANN. Before you go to that point. Have you given all the specific instances where you claim that the Government of Nicaragua interfered directly with your construction?

Mr. MASON. Other than those that Mr. Hitchcock stated this morning, I think I have.

Mr. MANN. I don't remember that he stated any.

Mr. MASON. I think he read over a list of them.

Mr. BARHAM. Yes.

Mr. MASON. A lot of communications had with the Secretary of State.

Mr. BARHAM. You say a million dollars down in Nicaragua is considered a large amount of money. What is the term used in that concession?

Mr. MASON. "Great capital."

Mr. BARHAM. A million of dollars is great capital there. Well, do you think that a concession could be had from Nicaragua to-day for a right of way over that lake, with the right to defend the canal, for a million dollars?

Mr. MASON. Do I consider that a new concession could be had?

Mr. BARHAM. Yes; assuming the field to be clear.

Mr. MASON. They have just granted what they claim to be a new concession for \$100,000.

Mr. BARHAM. You would think a million of dollars, then, would reach almost any kind of a concession?

Mr. MASON. It depends entirely on who applied for the concession.

Mr. BARHAM. Suppose the Government of the United States applied?

Mr. MASON. I think they would not get it for \$10,000,000—\$20,000,000.

Mr. ADAMSON. Right there, if it will not interrupt you, I would like to ask you a question.

Mr. MASON (continuing). Except under a treaty.

Mr. BARHAM. Of course, under a treaty. We could not get it in any other way.

Mr. MASON. Of course, under treaty obligations, I could not say. We might get one for nothing.

Mr. BARHAM. Our Secretary of State, say, undertakes to carry on negotiations to get the concession through, and a treaty, of course, to build a canal there and get the right of way and the right to defend it. Don't you think the United States Government, by paying a million dollars, could get that?

Mr. MASON. Well, in one case the concessionary company were required to pay over \$4,000,000, and were obliged to give Nicaragua a one-third interest in all the receipts of the canal. I do not believe a government could obtain from those people any more advantageous

propositions than that, because it is a very different condition of affairs to build that canal on a commercial basis and to build it as a government under a treaty. In one case they retain rights as stockholders, and in the other case they do not. They have representation on the board of directors, have a voice in the management of the company—

Mr. BARNHAM. There have been instances, then, in which they did not consider a million dollars or two or three millions of dollars any very great amount of money—

Mr. MASON. I suppose it is fair to say that they have two views in contemplating the question of money. One, when they are looking upon a government representing 70,000,000 of inhabitants, and another where they are simply considering a few gentlemen who are business men, and nothing else. That communication with the Secretary of State, Mr. Gresham, took place in 1894. That is eight years ago. In July, 1894, we received a cablegram from Mr. Gresham in which he stated this:

I have just received a telegram from Minister Baker, as follows: Gamez letter forfeiting canal franchise withdrawn. All serene. W. Q. GRESHAM.

That was in answer to a telegram which he had sent to the United States minister at Managua instructing him to take the matter up, and Mr. Baker replied that finally Gamez's letter had been withdrawn, and everything was all serene.

Mr. ADAMSON. On page 18 of this report—

Mr. MASON. What report are you reading from?

Mr. ADAMSON. I suppose it is Senator Morgan's report.

Mr. MASON. The supplemental report, or the first one?

Mr. ADAMSON. I will read the language.

As soon as the company is ready to open subscription books it shall advise the Government of Nicaragua, which will invite the other governments, and through them private parties, to subscribe.

I suppose that is a literal quotation?

Mr. MASON. On what page?

Mr. ADAMSON. Page 18.

Mr. MASON. Yes, sir.

Mr. ADAMSON. Did the Government of Nicaragua accordingly invite the other governments to subscribe and through them invite their citizens to subscribe?

Mr. MASON. Yes, sir; most of the subscriptions to 5 per cent of the stock were sent to Nicaragua and Costa Rica.

Mr. ADAMSON. How could there be any question as to the legal right of this or any other government to take as much stock as it might want to buy?

Mr. MASON. No question whatever. This stock can be sold and transferred to any purchaser.

Mr. ADAMSON. I have read the paragraph you were talking about as to your terms. It appears, if you are correct as to the translation, that you are correct as to the conclusion. That would give you until October, 1900.

Mr. MASON. In the Costa Rica concession, 1901.

Mr. ADAMSON. In this Nicaraguan concession I am reading.

Mr. MASON. That dates from 1887.

Mr. ADAMSON. That would be 1899, then?

Mr. MASON. 1899, October 24. It is two and one-half years from 1897. It is from April, 1887. You see that would take us to October 24, 1889.

Mr. ADAMSON. Of course that kind of work can be done more cheaply,

if you had enough money to do it as rapidly as conditions will permit. Of course it would be a physical impossibility, even if you had \$150,000,000 placed in your treasury, to finish it in that time, wouldn't it? How long would it take to finish it, according to your estimates, if you had every dollar of the necessary estimates in your treasury, so that you could work all men and all appliances that you needed?

Mr. MASON. That would be very hard for me to say. Others could tell you that better than I could. But if we had every dollar we wanted, and could employ all the men we wanted—because, of course, there is a limit beyond which you can not put on any more labor to advantage—I should think the canal could be completed and constructed in about three and one-half years; certainly within four years.

Mr. BARHAM. Take this sentence, for a moment, in Article 9, "which will invite the other governments, and through them private parties, to subscribe." Do you think that would be an invitation to governments to subscribe to the stock? If you put "which will invite the other governments, and through them invite private parties"—

Mr. MASON. It does not change the meaning.

Mr. BARHAM. But the governments are to invite their people?

Mr. MASON. No, sir.

Mr. BARHAM. Isn't that the object?

Mr. MASON. The same clause is in the Costa Rican concessions.

Mr. BARHAM. That does not make any difference as to this clause.

Mr. MASON. No, sir; but I was explaining the object of that, because, while I did not negotiate the Nicaraguan concession, I did negotiate the Costa Rican concession, and these matters were very fully discussed at that time. The object was they did not want us to place all this stock in foreign countries and leave Central America out of it. Therefore they reserved 5 per cent, to give those governments an opportunity to subscribe if they wanted to.

Mr. BARHAM. Take the paragraph above that: "Of the capital with which the company shall organize, and which it proposes to distribute among the different countries interested in the enterprise, there shall be," etc. What do you use the word "countries" there for? Why don't you say "governments?" What do you mean by that?

Mr. MASON. It is very plain. Article 9 provides that the people of all nations shall be invited to contribute capital.

Mr. BARHAM. Not the nations, but the people.

Mr. MASON. Then it says that of this stock which it proposes to distribute among the different countries, wherever the stock may have been sold and placed, at least 5 per cent shall be reserved for the Central American Government and the people in that Government.

Mr. BARHAM. What would you say was meant by "Central American Government," there?

Mr. MASON. In printing this document the "s" has been left off. In the original translation the "s" is on there.

Mr. BARHAM. That is important.

Mr. MASON. It was so in the original translation.

Mr. BARHAM. That has been a stumbling block to me. I have not seen the "s" anywhere. You use "countries" in one place, and then, when you talk about stock, you use the word "government."

Mr. MASON. I have not another copy of that here to see whether the "s" is omitted in all copies or not.

Mr. BARHAM. Suppose the Government of the United States takes all of the stock except what is taken by Costa Rica and Nicaragua.

Would not that be a violation of the concession? Would not that be really a transfer of the concessions?

Mr. MASON. No, sir.

Mr. BARHAM. It would give the Government complete control and authority of it, wouldn't it?

Mr. MASON. It would give a controlling interest, but it would not transfer the ownership to it.

Mr. BARHAM. It was stated here yesterday that it would. That if you transfer all of the stock of a corporation you transfer the ownership.

Mr. MASON. In the first place, you do not transfer all the stock.

Mr. BARHAM. It is the same thing.

Mr. MASON. Nicaragua retains—

Mr. BARHAM. The principle is the same in law.

Mr. MASON. Nicaragua retains 6 per cent. Costa Rica retains 1½ per cent.

Mr. BARHAM. One has 50,000 shares and the other 15,000 shares? I understand that.

Mr. MASON. But then in order to place that construction upon it I submit that you have got to hold that in law the ownership of all the stock of a corporation is practically regarded as the same thing as the ownership of all the property.

Mr. BARHAM. Why is not that so?

Mr. MASON. Because it is not. I will give you an example of it. The laws of Pennsylvania prohibit foreign corporations from owning real estate in the State of Pennsylvania, unless they are corporations specifically mentioned in the statute, and yet the supreme court of the State of Pennsylvania has held that a foreign corporation may own all the stock of a domestic corporation, which owns all this real estate situated within the State.

Mr. BARHAM. And that it does not violate—

Mr. MASON. That it does not violate that provision of law.

Mr. BARHAM. But is not that merely technical. How could the Government of the United States, if it had not the right to buy the concession—isn't it merely technical to say that it can buy all except 75,000 shares of 1,000,000 shares? Wouldn't it be just as absolutely the owner of the concession as if the concession had been transferred?

Mr. MASON. But I do not admit—

Mr. BARHAM. I mean upon broad principles?

Mr. MASON. I do not admit, sir, that the United States Government has not the right to buy all this stock.

Mr. BARHAM. Assuming that, I say.

Mr. MASON. Assuming that it has not the right to buy all this stock, then the theory would be on that line that it would have the right to buy, of a capitalization of \$100,000,000, 49,900 shares, but it would not have the right to buy 51,000 shares.

Mr. ADAMSON. If that Government invited this Government to subscribe itself, and through it invites its citizens to subscribe, which you say occurred, I suppose that invitation is in existence somewhere?

Mr. MASON. Yes, sir; we forwarded stock subscription books to Costa Rica and Nicaragua, and we notified them that we had set aside 5 per cent of the stock—

Mr. ADAMSON. I understand that, but the language here is that that Government itself will invite other governments, and through them their citizens, to subscribe.

Mr. MASON. Yes, sir.

Mr. ADAMSON. I asked you a while ago if that invitation was actually extended?

Mr. MASON. Yes, sir.

Mr. ADAMSON. Is that invitation still open?

Mr. MASON. No, sir. Under the terms of the concession after six months—

Mr. BARHAM. Then it is clear the governments can not take the stock?

Mr. MASON. It is what?

Mr. BARHAM. I guess you did not understand the question. (Reading from article 9:)

As soon as the company is ready to open subscription books it shall advise the Government of Nicaragua, which will invite the other governments, and through them private parties, to subscribe.

I asked you if that was a correct translation, and you said it was, and I asked you if the Government, in accordance with it, had formally extended that invitation to this Government to subscribe?

Mr. MASON. To the United States Government? No, sir; not to my knowledge. That section relates to the Central American Governments.

Mr. ADAMSON. Only?

Mr. BARHAM. Then under what section could the Government of the United States purchase stock?

Mr. MASON. Under the entire concession, which gives the absolute right to transfer stock. It gives the right to transfer and sell stock. We would have the right to sell 30,000 shares of stock to France or any other government. There is nothing in the concession which prohibits the transfer of stock to anybody in person. The only transfer of stock which is prohibited in the concession is the transfer of the shares which are issued to Nicaragua.

Mr. BARHAM. That is expressly prohibited?

Mr. MASON. Yes, sir.

Mr. ADAMSON. Where is any language that justifies the construction that that is confined to these Central American Governments?

Mr. MASON. The section especially says that we shall reserve out of our capital 5 per cent for the Central American Governments.

Mr. BARHAM. But the last clause there, is that restricted to the Central American Governments?

Mr. MASON (quoting). "As soon as the company"—yes, sir; that relates to the Central American Governments.

Mr. BARHAM. That whole article relates to Central American Governments?

Mr. MASON. No; the last two.

Mr. MANN. Then the only nations that were to be invited to subscribe for stock were the Central American Governments?

Mr. BARHAM. Under that article?

Mr. MASON. Yes, sir; that portion relates to that 5 per cent of stock reserved for those governments.

Mr. BARHAM. There is no other provision requiring them to offer stock to any other government or people, is there?

Mr. MASON. The whole object of that, as I have stated, was so that the Central American governments should have an interest in this canal.

A MEMBER. And no other government?

Mr. MASON. And that we should not sell all the stock abroad, so that they would not be able to get hold of any.

Mr. ADAMSON. There are several provisions prohibiting other

governments from taking control. Is there anything from which you can draw your conclusion that the French Government or this Government may acquire stock in that corporation? What language is there that you draw that conclusion from? There are provisions there that may be construed the other way?

Mr. BARHAM. I thought that section gave them the right, but he says it does not.

Mr. MASON. The fact that this concession is vested in a stock corporation; the fact that—

Mr. ADAMSON. I do not ask for a general argument. I ask, Is there any language in that concession from which you can draw the conclusion I have stated?

Mr. MASON. I draw that conclusion from the whole language of the concession.

Mr. ADAMSON. If that paragraph does not authorize the inviting of other nations to take stock, what other paragraph does?

Mr. MASON. There is no other paragraph which provides for an invitation to nations.

The CHAIRMAN. What do you understand are the purposes of this language in article 8—

The present concession is transferable only to such company of execution as shall be organized by the Nicaragua Canal Association and in no case to governments or to foreign public powers.

Now, what was the purpose of inserting the last clause there—
and in no case to governments or to foreign public powers.

Mr. MASON. To prevent the Nicaragua Canal Association from transferring the concession direct to some foreign government.

The CHAIRMAN. Was it not for the purpose of preventing a foreign government or foreign public power from controlling the canal?

Mr. MASON. No, sir; not in my judgment.

The CHAIRMAN. What other object could they have other than to keep the control, the physical control, of the canal out of the hands of a foreign government?

Mr. MASON. Unless it was transferred to a corporation all the provisions of this concession which related to Nicaragua were practically defeated. She got 6 per cent stock. She claimed many other privileges under the concession. She has rights to tolls and privileges, and she has reversionary rights under it.

The CHAIRMAN. You think, then, at all times Nicaragua has been perfectly content that a foreign government might control that canal?

Mr. MASON. At all times, did I understand you to say?

The CHAIRMAN. Well, at any time?

Mr. MASON. In the sense of owning a majority of the stock?

The CHAIRMAN. In the sense of control.

Mr. MASON. I do not think there has ever been a time when Nicaragua has objected to the United States Government controlling that canal, and, in fact, we have here among our records letters from the minister of Nicaragua expressing great delight at the prospect of the Government's taking that.

The CHAIRMAN. You think it would have been entirely competent for you to have conveyed a majority of the stock, and therefore control over the canal, to Honduras, a rival nation, or to Costa Rica, a rival nation, and that Nicaragua would have consented to that?

Mr. MASON. If we had transferred a majority of the stock, I think we had a right to.

The CHAIRMAN. You could in that way have given its rival nations control over this great artery of commerce. And you think that Nicaragua did not use this language in this concession for the purpose of preventing that thing being done?

Mr. MASON. In my judgment she did not. It was to prevent the assignment of the concession in a different manner from that which was contemplated in the terms of the concession itself.

The CHAIRMAN. Then you think she was simply looking to the preservation of her pecuniary interests, amounting to 6 per cent of the capital stock, and not to her great political interest she might have in controlling the canal herself, rather than allowing a rival to control it, when she inserted that language in that concession.

Mr. MASON. She did not lose control of the canal under the concessions by having any government own a majority of the stock under those concessions. There is nothing, as I take it, to prevent any government from going out into the market to-day and buying up a controlling interest, if they could get it, in the stock of the Maritime Canal Company, never transferring it, taking the certificates of stock in their quasi negotiable condition and locking them up in a safe. They would then virtually own all the stock.

The CHAIRMAN. But it is your opinion that Nicaragua did not try to prevent the happening of just such an event?

Mr. MASON. No, sir; I do not think she did.

Mr. ADAMSON. Is there any official declaration on this subject at all, or has it been mooted in Nicaragua at all? Do you know how they consider this question of other nations taking stock?

Mr. MASON. I know of no expression on the part of Nicaragua on that particular point.

Mr. ADAMSON. You said you had some letters from a minister on some subject.

Mr. MASON. The minister from Nicaragua has been a director in the Maritime Canal Company since it was started, and I stated that we had letters from him, and some of them are published in these reports, showing that the action of the United States in undertaking two or three years ago to legislate on this subject was received with a great deal of delight, and that Nicaragua was very glad of that fact. The only instance I know of any adverse action is the letter which was written by the minister of the Diet of Central America some two years ago, I think, or a year and a half ago—the letter of Mr. José de Rodriguez, which you probably know about; that is the only instance.

Mr. BENNETT. You then disagree with this concession to Eyre and Cragin in relation to that statement of theirs that the Government of Nicaragua especially objects to the United States assuming ownership in the canal?

Mr. MASON. I disagree with—

Mr. BENNETT. You were here yesterday and heard the statements. You disagree with the statements they made yesterday?

Mr. MASON. Yes. I did not hear any statements that Nicaragua—who made it?

Mr. BENNETT. Mr. Cragin made it as he closed.

Mr. MASON. No, sir; I have no advice that Mr. Cragin has been appointed to represent the Government of Nicaragua. I do not know that he is authorized to speak for it. He used to represent the Maritime Canal Company in a humble way.

Mr. BARHAM. He could convey information?

Mr. MASON. Certainly, sir. He may be posted on that subject.

Mr. BARHAM. We wanted to know whether you had any knowledge on that subject.

Mr. MASON. During the time I have been connected with this company Nicaragua has never claimed, to my knowledge, that we did not have the right to transfer all the stock of this company to a government if we saw fit to do so, and that question was never raised until Mr. Rodriguez raised it, and it was only raised by him because he got the cue from reading the discussions in Congress, where it was raised by several members of the Senate and of this House.

Mr. BARHAM. You have made the statement that he got the cue from that. Do you know that is so? Do you know that he got his cue in that way?

Mr. MASON. When I say that he got his cue, I mean to say that he did not raise the point until after it had been raised in Congress.

Mr. BARHAM. Now, I want to direct your attention to article 10, the last paragraph:

Its name shall be The Maritime Canal Company of Nicaragua, and its board of directors shall be composed of persons one-half, at least, of them shall be chosen from the promoters who may yet preserve their quality as such.

Now, the bills which have been introduced here, all except one, provide that the United States shall have from eight to nine of the directors out of the eleven. How can that be?

Mr. MASON. As soon as you take all the stock away from the members of the Maritime Canal Company every one of the promoters has lost their—

Mr. BARHAM. Quality as such?

Mr. MASON. Quality as such. And in addition to that I will say—

Mr. BARHAM. But that leaves you without any power. How can the Government of the United States appoint directors if that is so?

Mr. MASON. This section refers to the first board of directors. It was so understood.

Mr. BARHAM. It does not say so.

Mr. MASON. No; it was left in that condition.

Mr. BARHAM. Did you use the words in the Costa Rican—

Mr. MASON. No. I think I put in the words "The first board." I do not think I left it open.

Mr. BARHAM. You will have to put in some new words here or the Government can not have nine directors.

Mr. MASON. Yes, sir; there will have to be some words understood. If there are no directors who preserve their quality as such, that leaves the door open to any other directors. It does not mean to say that there shall be no directors because there are no promoters. The promoters might all die. If there are no promoters who retain their qualifications as such, you could not very well appoint a majority of them directors.

Mr. BARHAM. I want to know the facts. Have you ever looked at the meaning of the word "promoter?"

Mr. MASON. Yes, sir.

Mr. BARHAM. Don't you know the United States is a promoter of this enterprise under every definition of the word in the world?

Mr. MASON. Yes, sir; I think she is.

Mr. BARHAM. Of course, that is the reason then. The Government of the United States is a promoter of this enterprise.

Mr. MANN. Not at the time of this concession?

Mr. BARHAM. Yes.

Mr. MANN. Not a promoter of that concession?

Mr. MASON. In the Costa Rican concession I had that changed so that it read: "That the first board of directors," etc. The Government of Nicaragua has always given that interpretation to that section. At the time that the board was made up its own directors took that view. I read from a letter by Mr. Guzman, the minister of Nicaragua, dated January 30, 1895, written to Mr. Hitchcock, president of the company:

I was sorry you could not be here the day our bill passed the Senate, but I saw by your telegram that you were detained by a sad loss in your family. I should have written you before this about the great victory had I not been sick.

Please accept my congratulations for the success of the bill and let me hear as soon as possible about your future plans. I am sure my cablegram announcing the victory was received with joy in Nicaragua.

Very truly, yours,

H. GUZMAN.

Later, Mr. Hitchcock received a letter from Hon. Lewis Baker, minister to Central America, written from San Jose in January, 1895—as late as that:

The general minister of Nicaragua this morning informed me that the canal guarantee bill passed the Senate, and if this good news is confirmed I shall expect the bill to pass the House. If this proves true, won't you do me the favor to cable me promptly giving the facts. On the statement of the Nicaraguan minister I have sent congratulatory messages to both the Nicaraguan and Costa Rican Governments.

They have at all times received with delight the suggestion that the United States Government was going to take hold of this enterprise.

Mr. BARHAM. They did not manifest much delight when we got Rodriguez—

Mr. MASON. That was not the action of Nicaragua. It was the action of the Diet of Central America, and has never been confirmed by Nicaragua.

The CHAIRMAN. That is regarded as of very great local interest by the people of Nicaragua?

Mr. MASON. It ought to be, and I presume it is.

The CHAIRMAN. They have no other outlet to the Atlantic except by this route?

Mr. MASON. No, sir.

The CHAIRMAN. The productions of Nicaragua are very largely confined, that is, the exports, to the west and north of Nicaragua?

Mr. MASON. They go to Corinto mostly.

The CHAIRMAN. To the Pacific. They have no railroad eastward from the lake, have they?

Mr. MASON. No, sir; but they have a line of steamboats which run from Grenada down to the mouth of the San Juan River, and then a line of river boats which run from the lakes down the river to San Juan del Norte.

The CHAIRMAN. How many portages are there on the river between the lake and the mouth of the river in low water?

Mr. MASON. I think there are two around the Machuca Rapids; and at the Toro Rapids there may be one.

The CHAIRMAN. Are those portages necessary at all seasons of the year?

Mr. MASON. I think there are certain seasons of the year when they are not required. I know some of those steamboats which have been carried up over the rapids.

The CHAIRMAN. In the dry season there are a larger number of portages than two, are there not?

Mr. MASON. I do not know, sir. I will get you to ask Captain Miller to explain that to you.

The CHAIRMAN. Could you give us any idea of freight rates from Greytown to Rivas, say?

Mr. MASON. If you would like information on that subject I would like to give way to Captain Miller.

The CHAIRMAN. Wait until you get through, then.

Mr. MASON. I don't know that I have anything more to say unless there are other questions that the gentlemen of the committee would like to ask me.

Mr. STEWART. In article 8 of the concession to the Grace syndicate I find the following language:

The Government shall bind itself and shall declare that no concession or privilege heretofore granted by it opposes, conflicts, embarrasses, or prejudices in any manner the concessions promised in this contract for the contract for the construction, extension, maintenance, operation, and repairs of the interoceanic canal and its appurtenances.

How do you propose to get over that on October next?

Mr. MASON. Well, I take it, this latter concession is subject to article 4, which is a promise of a concession, namely:

The Government promises to grant to the said Interoceanic Canal Company the exclusive right for the construction of an interoceanic canal in accordance with the conditions hereinafter stipulated, but it is understood that the company can not demand the fulfillment of this promise except after the rescission of the Cardenas-Menocal contract shall be obtained, or after said contract for other reasons shall cease to have legal existence.

Mr. STEWART. It is a principle of law that a later provision will rescind a prior concession.

Mr. MASON. Yes, sir.

Mr. STEWART. Would not that later provision in section 8 control and modify the fourth section you have just read? The later would control the former, wouldn't it? That is a principle of law.

Mr. MASON. But I take it, sir, that article 8 will not go into effect, nor indeed any of the articles of this contract, until the concession granted to the Maritime Canal Company has expired or has ceased to exist for legal purposes. Therefore, that section 8 could not relate to the Maritime Canal Company's concession, because article 4 expressly relates to this whole contract, that it shall not go into effect or any other provisions be obligatory until the Maritime Canal Company's concession has ceased to exist, for whatever cause. After it has ceased to exist, then these provisions would go into effect.

Mr. STEWART. You heard the testimony of Mr. Cragin yesterday to the effect that the supreme court of Nicaragua, with the exception of one member, has decided that the Maritime Canal Company's concession would so expire next October.

Mr. MASON. That statement I hardly think is so. And I think Mr. Cragin would himself amend that statement if he were here. What took place down there, as I understand it and simply from information, as I was not there, is that the President of Nicaragua called several members of the supreme court together to advise him as to what the status of this concession was; that its members were divided and disagreed.

Mr. STEWART. Eight to one, I believe?

Mr. MASON. I have no such information on that subject.

Mr. STEWART. That is what Mr. Cragin said.

Mr. MASON. That is a matter of record. It is a matter of fact down

there, and I doubt if he will sustain that point. At any rate we have under our concessions all the guarantees that are given.

Mr. STEWART. But we do not want to buy a lawsuit, no matter whether it is ex parte or not. If we are met with that judgment, we have to set it aside, and we would be buying a lawsuit.

Mr. MASON. My only answer to that is that I can give you the legal construction of a contract, but what the sovereign power has exercised, what right of forfeiture they have exercised down there, I do not know, and our only protection is that the United States should see that we are not deprived of our rights.

Mr. STEWART. If we had to deal with a Saxon nation, we would know how to consider that.

Mr. MASON. It seems to me that whatever rights we have are there, and they should be determined as provided by the concession; namely, if the concession should be forfeited—

Mr. STEWART. Then you abandoned the concession by a nonuse?

Mr. MASON. No, sir.

Mr. STEWART. As Mr. Hitchcock testified, you practically abandoned work when the construction company went into liquidation and nothing had been done since. Is not that in law an abandonment of the contract?

Mr. MASON. No. They have recognized the fact that it is not. They recognize in this very concession, themselves, that it has not expired.

Mr. STEWART. They say if you have shown celerity and good faith.

Mr. MASON. I have tried to cover that. I think you will find it a matter of record.

Mr. BENNETT. When do you imagine your concession as a nonuser would expire—this concession you hold?

Mr. MASON. I say that Nicaragua has the right to do this. After October, 1899, it has the right then, if it sees fit, to declare that it considers this concession forfeited. When we notify them that we think we are entitled to an extension of this concession for the reasons heretofore stated, we are then entitled to have the whole matter referred to arbitration under the provisions of the contract, to determine whether or not the concession has expired, and the forfeiture is proper at that time.

The gentlemen who have put their money into this enterprise, the holders of the bonds in this corporation, men and women all over the United States, put their money in relying on this concession, and the fact that this protection was afforded to us, that Nicaragua waived the right to exercise its sovereign will and declare it forfeited ex parte by providing that any question upon which we disagree should be referred to a board of arbitrators, and that that court should determine whether they were right or we were right—

Mr. MANN. Suppose they should refuse?

Mr. MASON. Then our only protection is to come to the United States Government and say, "There is our concession; there are our rights; we have vested rights there; there are citizens all over this country that are interested in these rights, and we ask you to see that justice is done us."

Mr. MANN. Suppose the Nicaraguan Government should say that you could bring a suit against it in its own courts to determine any damages you have suffered?

Mr. MASON. We have a right to rely on the contract itself.

Mr. MANN. You have a right to sue for damages if they do not carry out the law.

Mr. MASON. When you are dealing with a foreign government the only protection you have is to depend upon your own government. This concession is on a par with the Delagoa Bay matter.

Mr. MANN. Don't go into that; it is too long winded.

Mr. MASON. It is the same.

Mr. MANN. Suppose they permit you to sue for damages in their own courts. That is all this Government would permit you to do. That is what this Government would probably do. Suppose they pass a law permitting you to sue for damages if they have not fulfilled their contract; could you ask for any more?

Mr. MASON. I certainly should, as attorney for this corporation.

Mr. BENNETT. The statement was made before the committee this morning by Mr. Hitchcock in regard to the preparation of statements. Did your office have anything to do with that preparation?

Mr. MASON. No, sir; those statements were prepared by the secretary and treasurer of the corporation.

Mr. BENNETT. And you have no knowledge of them?

Mr. MASON. No, sir.

Mr. BENNETT. If this bill or the so-called Morgan bill in the Senate should pass, the Government of the United States would acquire a right simply to an arbitration in the first place for the purpose of questioning an extension of time, wouldn't it?

Mr. MASON. I don't think there would be any question as to what would happen if you passed the Morgan bill. Nicaragua would pass the concession at once.

Mr. MANN. In view of the concession already granted?

Mr. MASON. Yes, sir. All that Nicaragua has to do is to get the supreme court to determine that they had no right to grant that concession at the time they did grant it, and that is plain.

Mr. MANN. It was stated yesterday, though, that the judges, or all but one of them, were consulted before this concession was granted, and so that would make this a prejudged case now.

Mr. MASON. I question the authority of that.

Mr. MANN. The statement was made positively, and if that is the fact you would hardly get the supreme court to set that aside.

Mr. MASON. The supreme court did not deliver any decree.

Mr. BENNETT. So far as you know.

Mr. MASON. I am quite sure of that.

Mr. MANN. If they were consulted by the President, and on the strength of their opinion this was entered into, it would very likely have some influence on their future opinion?

Mr. MASON. I don't think so. I want to say here that I have no antipathy or any feeling on the subject of this Grace-Eyre contract. Most of the gentlemen who constitute this syndicate are personal friends of mine, and I know them all well, and I do not want to say anything that places me in any way in the position of antagonizing what they have done. I simply think that Nicaragua has availed itself of an opportunity to sell a concession once more, when another concession was outstanding. I think that this concession was an absolute violation of our own concession, which is a public act and a law of the land of Nicaragua, and therefore could not be declared by the supreme court of Nicaragua as absolutely void. And I not hesitate to say that I think they have no particular love for the gentlemen constituting this syndicate. They have no more love for them than for anybody else who would go down there and purchase a concession from them.

Mr. MANN. But here is the concession signed and carried through,

as you claim, by all the officials necessary to execute it, decreeing that your concession ends on the 9th of October. If you go ahead all you have is the right to submit to arbitration, isn't it?

Mr. MASON. Unless they rescind that position. Of course if they maintain that position we have got to combat it. There is no question about that; and we have got to enforce our rights.

The CHAIRMAN. And in that combat you have apparently the legislative, the executive, and the judicial branches of the Government against you?

Mr. MASON. I do not admit that we have the judicial branch against us.

The CHAIRMAN. Well, this statement was that five had stated you were without rights—

Mr. MASON. But the judicial branch has never passed upon this question at all to my knowledge.

Mr. BARHAM. They seem to have been consulted.

The CHAIRMAN. At all events the United States, as successor to your rights on the 10th day of October, would have to seek some kind of arbitrament, wouldn't they, either through this arbitration that is provided for or through new concessions of extension by the executive and legislative branches of the Government?

Mr. MASON. Under the Morgan bill?

The CHAIRMAN. Yes.

Mr. MASON. Naturally, under the Morgan bill, after this—

The CHAIRMAN. Then, necessarily they must go to that Government with some kind of negotiation after the 9th day of October.

Mr. MASON. The bill itself provides that that shall be done.

The CHAIRMAN. You say that yourself.

Mr. MASON. Yes, sir; this concession has to be extended anyway.

The CHAIRMAN. Going back a moment; at the time the concession to the Maritime Association was made, was there at that time in existence another concession under which certain persons had the right of exclusive navigation of the San Juan River and of the canal?

Mr. MASON. There was a concession known as the Hollenberg concession, which was owned by S. A. Pellas, that gave him the exclusive right of navigating the San Juan River. Our concession was subsequent to that, and it was provided that we should acquire that in a certain period. We could acquire those rights.

The CHAIRMAN. You acquired that?

Mr. MASON. Yes, sir.

The CHAIRMAN. Who acquired that?

Mr. MASON. I can not remember now who acquired it in the first instance. It ultimately passed over to the Maritime Canal Company.

The CHAIRMAN. Let me remind you. Was it not acquired by the construction company, and was not the construction company invested with all of the title, and later, under certain proceedings, was not that right, whatever it was, sold under what we would call executing here, and the title invested in the old concessors?

Mr. MASON. The history of that matter is this. A corporation was organized under the laws of the State of Colorado known as the Nicaragua Mail, Steam Navigation and Trading Company. That company acquired the rights of the Pellas Line of steamers, a controlling interest in that line of stock being acquired and held by the Nicaragua Construction Company, Mr. F. A. Pellas retaining an interest in the new corporation. The Nicaragua Mail, Steam Navigation and Trading Company operated that line of steamers. It went into the hands of a

receiver about the same time that the Nicaragua Construction Company went into the hands of a receiver, and it was the Nicaragua Mail, Steam Navigation and Trading Company which was attached, and whose property was sold out under judicial decree, the cause of that being chiefly due to the fact that a big steamer of the company which operated on the lake (and the only large steamer on Lake Nicaragua) was sunk during a revolution.

It cost the Nicaragua Steam Navigation and Trading Company somewhere in the neighborhood of \$40,000 in order to raise the boat, and not having the appliances that are usually used for that purpose it cost the company more than it otherwise would have cost it. And it was not in a position to meet those expenses. The man who raised the boat brought suit against the Nicaragua Mail, Steam Navigation and Trading Company and issued this attachment. The Nicaragua Company, which owned a majority of the stock, itself being in financial difficulties, was unable to come to the assistance of the Nicaragua Steam Navigation and Trading Company, and the result was that this property was sold out.

The CHAIRMAN. That included the concession?

Mr. MASON. That included the concession, which lapsed a very short time afterwards. With all that plant, not so much for the property it consisted of in the shape of boats and so on, but in order to get this concession, which was in the way of our concession, our concession was subject to it.

The CHAIRMAN. Does the Maritime Canal Company own that concession now?

Mr. MASON. That concession has expired, sir, and the new concession has since been granted to the people who are operating that river, and that concession is subsequent to our canal concession, and it is practically merged in the Atlas Steamship Company.

Mr. STEWART. Did that defunct company own the Hollenberger concession?

Mr. MASON. Yes, sir.

Mr. STEWART. That was the original holder of the concession—the Hollenberg concession?

Mr. MASON. No. Pellas acquired the Hollenberg concession, and then the Nicaragua Mail, Steam Navigation and Trading Company acquired it from Pellas.

Mr. STEWART. You said a moment ago that you did not remember the origin. You have given a pretty clear account.

Mr. MASON. I had forgotten whether the Nicaragua Canal Construction Company had acquired the stock of the construction company or whether the Maritime Canal Company had acquired it; but I remember now that it was the construction company that acquired it. That line of steamers is now practically run by the Atlas Steamship Company, and their concession, which grants an exclusive right over the San Juan River, while it is subsequent to our concession, comes in ahead of the Grace Syndicate concession.

The CHAIRMAN. It is not an impediment in your way at all?

Mr. MASON. No, sir; but it will have to be gotten out of the way for this other concession. Mr. Hitchcock calls attention to the fact that the Atlas Steamship Company has filed a protest with the Nicaraguan Government against the granting of it, just as we have.

THURSDAY MORNING, *January 19, 1899.*

Mr. HEPBURN. This morning was set apart for hearing the representatives of the Maritime Canal Company, and we will proceed with the understanding that the hearing will close at 12 o'clock.

Mr. HIRAM HITCHCOCK. Mr. Chairman and gentlemen, if it suits your pleasure, I will make a brief statement of the events leading up to the present somewhat complicated situation and then state to you the work that has been accomplished and the amount that has been expended. Any discussion with reference to the nature and terms of the concession I will leave to the counsel of the company. Any question with reference to engineering I will be glad to leave to one of the engineers who has been attached to this enterprise for a great many years. The withdrawal of the Frelinghuysen-Zavala treaty in 1885 seemed to terminate for the time being any possibility of this Government having any interest in the Nicaragua Canal. In December, 1886, a party of gentlemen, of which I was one, formed an association for the purpose of obtaining concessions from Nicaragua and Costa Rica for the construction of a canal. We sent out Mr. Menocal in the spring of 1887, and he obtained a concession from Nicaragua. Very soon we found that the concession from Nicaragua was not sufficient for the purpose. Costa Rica raised objection to it on the ground that it was in conflict with her rights under the treaty of limits of 1858 between Nicaragua and Costa Rica, which gave Costa Rica the joint right of navigation on the San Juan River.

Costa Rica protested formally against the Nicaragua concession. When we obtained the Costa Rican concession Nicaragua protested, and we then found it was necessary to have some governmental recognition. Judge Edmonds evidently anticipated the same necessity, and on the 10th of January, 1888, introduced a charter. The Costa Rican concession was granted in July, 1888, and in September, 1888, Nicaragua protested against it. In February, 1889, the charter was passed and approved. May 4, 1889, the company was organized. On the 7th of May, 1889, in company with former Chief Justice Daly, who is still connected with the company as vice-president, and Engineer Menocal, I called upon Mr. Blaine, Secretary of State, went over the whole canal history with him, laid the matter fully before him, and told him in view of the difficulties we had encountered in Central America it seemed to me that, if we were going on, we ought to have the support of the Government of the United States. Mr. Blaine most frankly pledged us that they would protect us in our charter rights and concessions. In June, 1889, work was begun; in July, 1889, the Nicaraguan Government ordered the work to be stopped, but modified the order by saying that they would not regard it as having been officially commenced at that time. Mr. Blaine was appealed to again. In August, 1889, the Government of Nicaragua notified the company that if it did not rescind the Costa Rican concession they would pronounce the concession they had given us null and void on the 24th of October. Of course, this brought on a crisis. Accompanied by a committee of those interested in the company, I met Mr. Blaine on the 23d of September, and Mr. Blaine sent a dispatch to the American minister in Nicaragua, dated September 25, 1889 (Senate Doc. 184, second session Fifty-fourth Congress), as follows:

MIZNER, American Minister, Managua, Nicaragua:

The Government of the United States has heard with great surprise that some movements are on foot in Nicaragua to impair or possibly destroy the rights of the Maritime Canal Company as embodied in the concession made to that company by

the Government of Nicaragua. This Government refuses to believe that Nicaragua would do any injustice to a company chartered by the Congress of the United States, and relies implicitly upon the good faith of Nicaragua. Advise me promptly as you possibly can what situation of affairs has given rise to these disquieting rumors. The Government of the United States can not remain passive if any of the rights of a corporation organized under its own laws shall be threatened with injustice. You will please read this dispatch to the Nicaraguan minister for foreign affairs, Mr. Guerra, and will leave with him a paraphrase if requested.

BLAINE.

The result of that was that on the 8th of October an agreement was entered into, executed in triplicate on behalf of the company, on behalf of Nicaragua, and on behalf of the United States, which settled all differences, and the Government of Nicaragua recognized that work commenced October 8, 1889. Costa Rica, on the following day, raised some question, and Mr. Blaine directed Mr. Mizner to go over to San Jose and adjust matters there. (Senate Doc. 184, p. 79.)

In January, 1890, a contract was entered into with the construction company, whereby they were to go on and complete the canal and take payment in stock and bonds of the company. Very soon thereafter, April 11, 1890, a resolution was offered in the Senate calling for an investigation of the affairs of the company for the purpose of ascertaining what, if anything, the United States should do in aid of the company. Later in the year, the 19th of September, there was a question raised as to what the attitude of the Government of Nicaragua would be at the settlement which was to take place as to the amount expended in the first year's work. On the 19th day of September Mr. Blaine telegraphed Mr. Mizner, the minister (Senate Doc. 102, p. 67), directing him to go and see that the accounts were fairly settled between the company and the Government. Mr. Mizner did so, and it was reported by him to the State Department and by the Nicaraguan minister to us that we had more than complied with the requirements, and had expended \$3,099,971.02 in the first year's work. In 1891, January 10, the Sherman bill was presented to the Senate, and from that time to this the record will show a great many bills and resolutions have been presented in both Houses. The effect of this has been to cause the people to say: "Well, I don't know; this is a great thing, a good thing, probably, but a work of great magnitude. The Government should take hold of it; should control it and erect it. There are a great many complicated questions involved in it." The panic of 1893 coming on, with all these questions raised, embarrassed our people in their arrangements with large capitalists, and the company was obliged to suspend, and the work was practically stopped in 1894.

Of course there have been a great many questions come up, but the relations between the Governments of Nicaragua and Costa Rica and the company remained friendly, as shown by the records of the company, and reported to this Government and printed down to 1895 and 1896. But in 1897 the Nicaraguan Government granted a concession to the Atlas Steamship Company, and we felt that our rights were involved in that matter, and that it was against our concession. We made no protest, however, on that point. Congress appointed a commission—the Ludlow Commission—in 1895 to examine the route in the interests of the United States Government. When the present Administration came in a second commission was appointed, known as the Walker Commission. On the 22d day of March, 1897, a few days after the present Administration came into power, in company with some Senators and Representatives, I called upon Secretary of State Sherman to ascertain what the position of this Administration was in refer-

ence to the canal, and we went over the whole subject. Secretary Sherman concluded that the only way was to pass some bill whereby the canal could be protected and completed by the Government of the United States. This was assented to by all present, and he promised the efforts of the Government to protect us in every possible way.

We explained to him that we were very anxious about matters in Central America relating to concessions, and called his attention to Senate Document 184, Fifty-fourth Congress, second session, page 58, which contains a statement from Minister Mizner to Mr. Blaine, in which Mr. Mizner says in which, in communicating to the Nicaraguan Government, he called its attention to the language of General Cass when Secretary of State, on July 25, 1856, on the subject of canal confiscation, in which General Cass, instructing General Lamar, minister resident to Nicaragua, says:

The United States, acting in behalf of their citizens, object to this system of confiscation, and they do not doubt but what they will have the concurrence of all other powers who have similar interests in these vastly important measures. What the United States demand is that, in all cases where their citizens have entered into contract with the proper Nicaraguan authorities and questions have arisen or shall arise respecting the fidelity of their execution, no declaration of forfeiture, either past or to come, shall possess any binding force unless pronounced in conformity with the provisions of the contract, if there are any, or if there is no provision for that purpose, then unless there has been a fair and impartial investigation in such a manner as to satisfy the United States that the proceeding has been just and that the decision ought to be submitted to.

Without any security of this kind this Government will consider itself warranted, whenever a proper cause arises, in interposing such means as it may think justifiable in behalf of its citizens who may have been or who may be injured by such unjust assumption of power.

The result of that interview with Secretary Sherman was an assurance that the Administration would endeavor to protect the canal charter and concessions and favor its completion. He communicated this decision to the Nicaraguan Government. Later, in June, we had a conference with the President, who expressed a sincere wish to have the canal completed and that the status quo be retained until the results of the Walker Commission were announced and Congress could have an opportunity of taking up the matter. In August last the Secretary of the Interior, in whose department the canal is, informed me that there was a project on hand to obtain new concessions and asked me to look into it, which I did and interviewed the parties connected with it, and I made a statement to the Secretary of the Interior in response to his request for information. That statement is included in my annual report, as follows:

The Maritime Canal Company was chartered by Congress in the face of a combined European and American opposition. Its stock, under the terms of the concession, was publicly offered to the people of the nations of the world. The amount subscribed was by the incorporators, who still retain it, and whose faith in the enterprise has never wavered. They made the payments and expenditures required under the terms of the concessions. Soon afterwards a resolution was offered in the United States Senate and referred to the Committee on Foreign Relations directing an examination into the affairs of the company, with a view to ascertaining what part, if any, the Government of the United States should take in the construction of the canal. This led to the introduction of a bill amending the charter, which has since been followed by very many bills of similar purport. The effect of the proposed Congressional legislative action has been to cause capital at home and abroad to say that it would await such action, or to say that only the Government itself could construct and protect so large a work with such vast international relations and responsibilities. The financial panic of 1893 caused the cessation of work by its agents.

This condition of affairs has necessarily led to a waiting attitude on the part of the company, during which time its franchises and possessions have been actively coveted by aspiring rival routes and interests, sometimes under the indirect inspira-

tion of foreign powers; and it has encountered criticisms and direct opposition of enemies in the United States and Central America.

In the face of all this the company has remained solvent and faithful to its trusts, and it has protected the enterprise and preserved it for the people and Government of the United States. Now that what the company has believed in and patiently labored and waited for these long years has recently been so clearly demonstrated to the understanding of everyone to be a national necessity, it occurs, as before in human experience, that others wish to acquire it. But it would be a work of manifest injustice for any combination of our citizens, at this late day, directly or indirectly to attempt to supplant this company of American citizens in the rights and property of an enterprise they have so truly conserved until all could clearly see that the fullness of time had come.

Congress has the right to amend the charter of the company in such terms as it deems wise, and therefore can make its own conditions. If it provides funds for the construction of the canal, the canal is in reality constructed from that hour.

The Maritime Canal Company of Nicaragua has only the desire that the canal may soon be a reality, whatever the result may be to its incorporators, and it confides in the honor and justice of the Government which created it.

The syndicate referred to was formed and parties representing it went to Nicaragua and Costa Rica to obtain concessions. Later the syndicate became convinced that it was unwise to obtain concessions under existing conditions, and was dissolved. The Government of Nicaragua, however, without being informed of this dissolution, entered into an agreement with the parties claiming to represent the syndicate, which agreement is in violation of the rights and interests not only of this company but of the United States and of Costa Rica.

At the time this agreement was about to be executed we had conferences with the President and Secretary of State, and instructions were sent to our minister to Central America to prevent any change in existing conditions.

Mr. HEPBURN. Without wishing to interrupt you—you say in that paper that the syndicate was dissolved. Has it since been reorganized?

Mr. HITCHCOCK. I have understood so. I have been informed to that effect; it is so reported: It is unofficial information.

Mr. HEPBURN. But at the times of the concession there was no syndicate?

Mr. HITCHCOCK. It had been dissolved. We were so informed by the different members of the syndicate, and that information was conveyed to us by the president and the secretary.

Mr. STEWART. What was the syndicate that was dissolved?

Mr. HITCHCOCK. It was a syndicate, as I have been informed, organized for the purpose of sending out and obtaining new concessions.

Mr. STEWART. Who was at the head of it?

Mr. HITCHCOCK. As far as I know, it was arranged by Mr. Ivens and Mr. Grace, of New York, at that time.

Mr. STEWART. Was the original syndicate hostile to the interests you represent?

Mr. HITCHCOCK. Well, sir, my answer to that would simply be that anything that would tend to disturb the existing relations between the company and the Government of the United States and interfere with the validity of existing concessions would be in opposition to the present company.

Mr. MANN. I don't want to anticipate you, but we would like to hear—if you are not going to follow it up—we would like to hear from you with reference to the expiration of your concession, what you claim with reference to that.

Mr. HITCHCOCK. If you will allow me, I would like very much to have the counsel of the company, who framed the Costa Rican concession and who has been our counsel since our organization, reply to you on that point.

Mr. HEPBURN. How much of the stock of this company was subscribed for?

Mr. HITCHCOCK. If you will allow me just a moment I will refer to that. In closing what I am now stating, I would like to call your attention to the fact that the concessions as they now exist, and the large grants of land which go with them, are ample, with the treaty of 1868, for the control and the protection of the canal, and we hold these rights under the charter from the Government of the United States. The Government, of course, can alter or amend that charter. The stock subscribed amounts to \$1,014,500. About \$1,000,000 has been paid by the company in carrying out the work, and it has issued its bonds and stock to its agents to enable them to carry out the work. The arrangement that was made was that the construction company would go on and complete the canal, and take the stock and bonds in payment. We have out something like \$1,000,000 in cash, and we have issued stock and bonds for work done, certified to by the engineers, pro rata to the total cost of the canal on the basis that it would cost us \$150,000,000 of bonds and a large block of stock. We have issued bond obligations to a little more than \$6,000,000, and stock obligations to the amount of a little less than \$3,000,000, making \$9,000,000 that we have paid to them in bonds and stock, and they have expended in surveys, plant, construction, and navigation rights \$4,287,736.73. Previous to that there was an expenditure by the old association of \$280,000. The expenses of administration and care of property, and a contribution made to the Ludlow commission, all amounted to \$268,692.24, which makes a total expenditure, according to my report, of \$4,836,428.97.

Mr. CORLISS. But your actual expenditures for work done is about \$1,000,000?

Mr. HITCHCOCK. The expense for work done is \$4,287,736.73.

Mr. CORLISS. And the amount fixed by the Senate bill at \$5,000,000 would more than pay you for your actual expenditures?

Mr. HITCHCOCK. Our actual expenditures have been—

Mr. CORLISS. The Senate has fixed the limit at \$5,000,000; that would more than pay you for your actual expenditures?

Mr. HITCHCOCK. Yes, sir.

Mr. BENNETT. How much of the \$4,000,000 is interest?

Mr. HITCHCOCK. Nothing for interest is calculated.

Mr. BENNETT. Is that the actual expenditure in cash?

Mr. HITCHCOCK. The actual expenditure in cash. There were, I think, however, \$265,000 of bonds that were used at their full face value and counted as cash.

Mr. BENNETT. That is a much larger amount than was ever before reported as your expenditure.

Mr. HITCHCOCK. I think you will find, if you will take my annual reports, that they are in harmony with this, and that these facts were reported.

Mr. HEPBURN. In this statement you make your distinction between actual cash payments and payments made from time to time in the securities of the company.

Mr. HITCHCOCK. The securities have been paid for the purpose of raising this money. They are mainly held by the construction company, which has raised its own money and paid it in, and its own expenditure is over four millions of dollars.

Mr. HINRICHSSEN. In a statement made here by a gentleman, he said there was an expenditure of six or seven hundred thousand dollars for certain dredges. They were dredges from the old Panama Canal Company. I understood him to say that that payment was made to him in

securities. Now, when you speak of these cash payments, do you include that item as cash, or do you refer to it as a payment made with securities?

Mr. HITCHCOCK. My understanding of that, from the construction company, is that \$265,000 was used as cash in that transaction.

Mr. HEPBURN. Was this stock all subscribed for in this country?

Mr. HITCHCOCK. Yes, sir.

Mr. MANN. How much of this stock was subscribed for and paid for?

Mr. HITCHCOCK. The fourth article of my last report shows that since the reorganization 10,145 shares have been subscribed for at par, amounting to \$1,014,500, of which \$1,007,840 has been paid into the treasury.

Mr. HINRICHSSEN. And that was the only cash furnished by the subscribers to this stock; the amount of money spent was the proceeds of the bonds?

Mr. HITCHCOCK. From the bonds and stock paid to the construction company.

Mr. MANN. And what did these bonds generally sell for?

Mr. HITCHCOCK. The bonds and stock together could not have brought more than 50 cents on a dollar. The bonds and stock were mainly paid to the construction company, and it raised its own funds.

Mr. MANN. On what basis was that done? What was the stock valued at; what were the bonds valued at in their transfer to the construction company?

Mr. HITCHCOCK. They were to receive \$150,000,000 of bonds and \$70,000,000 of stock for the completion of the work—practically \$220,000,000 of securities—and, we would say, in round numbers, it would cost \$100,000,000 to build the canal, and \$220,000,000 in stock and bonds might bring more than that.

Mr. MANN. That is, you were giving them stock and bonds more than double in amount of the cost in cash?

Mr. HITCHCOCK. We were.

Mr. MANN. What would the bonds and stock sell for; would they sell for 50 cents on a dollar?

Mr. HITCHCOCK. Yes, sir; I think so.

Mr. HEPBURN. I would like to ask if the persons composing the construction company were the same persons that composed the Maritime Canal Company?

Mr. HITCHCOCK. I don't know all the members of the construction company, but many gentlemen connected with it were stockholders in both companies.

Mr. HEPBURN. A majority of them were, at least?

Mr. HITCHCOCK. Yes; the list of stockholders of the Maritime Canal Company is something like 800, and embraces many of the representative men of the country.

Mr. CORLISS. Was there a single member of the Construction Company that was not a member of the Maritime Canal Company?

Mr. HITCHCOCK. My impression is that there were quite a number, but I could not say.

Mr. MANN. You are president of the Maritime Canal Company?

Mr. HITCHCOCK. I am.

Mr. MANN. And an officer of the Construction Company?

Mr. HITCHCOCK. No, sir; I never have been.

Mr. MANN. Is the Construction Company an organized, incorporated company?

Mr. HITCHCOCK. Yes, sir.

Mr. MANN. Under the laws of what State?

Mr. HITCHCOCK. Under the laws of the State of Vermont.

Mr. STEWART. Is there a contract between the Construction Company and the Maritime Company?

Mr. HITCHCOCK. Such a contract was signed between the Construction Company and the Maritime Company, and that contract still holds.

Mr. CORLISS. Do you know whether that contract has ever been printed and presented to a committee of the House or Senate?

Mr. HITCHCOCK. I could not say.

Mr. STEWART. Are you willing to present a copy to this committee?

Mr. HITCHCOCK. Yes, sir.

Mr. STEWART. Will you do so?

Mr. HITCHCOCK. I will.

Mr. STEWART. And put it in the hearings?

Mr. HITCHCOCK. Yes, sir.

Mr. MANN. How did you estimate when you paid over to the Construction Company stock and bonds of the Maritime Company the amount which they had expended?

Mr. HITCHCOCK. The work which they performed was certified by their chief engineer and by our engineer as a certain proportion of the whole work, and therefore they got a proportion of stock and bonds corresponding with the proportion of work which was certified.

Mr. CORLISS. From what did you make the statements that they had expended so much money?

Mr. HITCHCOCK. I got it from their reports to us.

Mr. CORLISS. They are required to make a report to you of the amount they had expended in cash?

Mr. HITCHCOCK. Yes; and we have access to their books.

Mr. STEWART. Have they made such reports itemized in any way?

Mr. HITCHCOCK. Yes, sir.

Mr. STEWART. Have you ever furnished a copy of that report to a committee of the House or Senate?

Mr. HITCHCOCK. No. There is a synopsis of a report with the Secretary of the Interior.

Mr. CORLISS. That does not give an itemized statement of the amount of money they have spent on the canal?

Mr. HITCHCOCK. No, sir.

Mr. STEWART. Have you a statement of those items?

Mr. HITCHCOCK. We have not the books of the Construction Company.

Mr. MANN. I understand that the company has furnished the Maritime Company with such a statement?

Mr. HITCHCOCK. Yes, sir.

Mr. STEWART. Will you furnish the committee a copy of that statement?

Mr. HITCHCOCK. Yes, sir.

Mr. STEWART. To be inserted in the hearings?

Mr. HITCHCOCK. Yes, sir.

Mr. CORLISS. You stated that the Maritime Canal Company had had actually paid into its treasury a million and some odd thousand dollars?

Mr. HITCHCOCK. Yes, sir.

Mr. CORLISS. Has that money been expended?

Mr. HITCHCOCK. A million dollars has been expended.

Mr. CORLISS. The Maritime Canal Company has paid out that money?

Mr. HITCHCOCK. To the Construction Company.

Mr. CORLISS. Aside from that one million dollars, do you know how much actual cash has ever gone into the treasury and been paid out by the Construction Company actually?

Mr. HITCHCOCK. No, not at this hearing; no further than this, that they have as I have read, expended certain amounts in surveys, plant, etc.

Mr. CORLISS. They certify that they have disposed of that amount, either in securities or cash; may they not have paid for it all in securities?

Mr. HITCHCOCK. No, because they have raised money from the sale of their own stock and bonds.

Mr. CORLISS. How much?

Mr. HITCHCOCK. I can not tell you; it is a matter with them.

Mr. MANN. Then you don't know?

Mr. HITCHCOCK. Not positively, sir, except we believe their statements to be correct.

Mr. STEWART. This statement you speak of in reference to the cash payments, as I understand, will show the amount of cash the Construction Company has paid out, but it may not show the way they have raised the money, by stock subscriptions or the sale of stock and bonds, but will show the amount of cash?

Mr. HITCHCOCK. Yes, sir.

Mr. STEWART. You have read from your statement to the Secretary of the Interior that this undertaking was such a prodigious undertaking that it should be built by the Government?

Mr. HITCHCOCK. Yes, sir.

Mr. STEWART. Didn't you know that fact when you organized your company?

Mr. HITCHCOCK. No, sir; we were not aware of the fact. We supposed the enterprise was a good one; that capitalists would come in and invest, and we did not apprehend the difficulties in the way of concessions and obstacles to contend with down in Central America.

Mr. STEWART. Did you have a purpose when you organized and got these concessions to dispose of them or unload them on the Government?

Mr. HITCHCOCK. No, sir; we have never appeared before any committee without being so requested by the committee, and that matter was opened up by Senator Edmunds's resolution in 1890, which was one year after this company was organized.

Mr. MANN. I want to know how much money the Maritime Canal Company has paid out?

Mr. HITCHCOCK. It has paid out money to the Construction Company, as I have stated, about \$1,000,000, and it has paid out in stock and bonds, in addition to the money as stated, about \$9,000,000.

Mr. MANN. I asked you how much money the Maritime Company paid out—money, not bonds or stock?

Mr. HITCHCOCK. Let me be understood; the first association was the Nicaragua Canal Association. They raised about \$300,000, and expended about \$280,000. That expenditure was transferred to the Construction Company, and they assumed it. That is this first payment for preliminary work incident to the procurement of concessions, \$280,000. Then the Construction Company came into the field, and we paid them \$1,000,000, and afterwards the stock and bonds.

Mr. MANN. All the money the Maritime Canal Company paid out was \$1,000,000 in cash?

Mr. HITCHCOCK. In cash, that is all.

Mr. MANN. And the prior association had paid out \$280,000?

Mr. HITCHCOCK. Yes, sir.

Mr. MANN. Is that a part of the million?

Mr. HITCHCOCK. No, sir.

Mr. MANN. Have you paid out any money since you have paid out the million dollars?

Mr. HITCHCOCK. Yes; we have paid out money for administration expenses.

Mr. CORLISS. How much money has the Maritime Canal Company paid out? How much cash have you paid through your treasury, wholly cash?

Mr. HITCHCOCK. We have received for stock \$1,014,500, and paid into the treasury from various other sources \$142,000, making a total of cash \$1,150,000. We paid \$1,000,000 to the Construction Company, and paid administration expenses besides, a portion of it from the balance.

Mr. CORLISS. How much have you in the treasury now?

Mr. HITCHCOCK. We have a few thousand dollars; I don't remember just how much. If you will allow me just a moment more, gentlemen, I wish to refer to the results accomplished, the prosecution of the work, the final survey, etc. I will say that while the actual canal excavation is about 26 miles, there have been 4,000 miles surveyed by transit and level in order to determine faithfully and exactly the best location of embankments, locks, dams, etc. All that work has been gone over, and those surveys have been proven to be correct by subsequent Government surveys. Second, the subterranean examinations of the strata requiring removal by the means of boring with a diamond drill. Third, the demonstration of the practicability and the safety of the required harbors. Fourth, the construction of walls and landing facilities. Fifth, the erection of permanent buildings for offices, quarters, hospitals, storehouses, shops, etc. Sixth, the building of a large number of temporary camps along the line for the accommodation of employees. Seventh, the completion of a telegraph line permitting ready communication with the works. Eighth, the clearing of the canal line of timber for some 20 miles. Ninth, the completion of surveys for location and plans for construction of the railroad system, and the construction and equipment of 11 miles of this line. Tenth, the acquisition of a valuable and extensive plant. Eleventh, the opening of over a mile of the canal. Twelfth, the acquirement from F. A. Pellas, in accordance with the Nicaragua concession, of the exclusive franchise for the steam navigation of the San Juan River and Lake Nicaragua.

Mr. HEPBURN. Were those expenditures made by the Maritime Canal Company or by the Canal Construction Company?

Mr. HITCHCOCK. They were made for the Maritime Canal Company by its agent, the Construction Company.

Mr. STEWART. I understood you to say you had turned over this matter of construction to the Construction Company, on their specified terms.

Mr. HITCHCOCK. Yes, sir.

Mr. STEWART. We would be glad, I think, if in your statement you would distinguish between those two companies, and, if you know, we would be glad if you would distinguish when you make a statement as to expenditures whether it was done by this company entirely independent of your company, except as the given relation of a contract between that company and the Maritime Canal Company.

Mr. HITCHCOCK. I have endeavored to be plain about that, and I will tell you about it again. This company made a contract with the Construction Company. It agreed to pay them in stock and bonds, as I have described. It has paid them a million dollars in money besides the stock and bonds. Now that company to which we have paid the stock and bonds has them mainly in its treasury, and has gone on and raised funds by the sale of its own securities, and has expended something over four millions of money; and they assumed the \$280,000 which was expended by their predecessors.

Mr. CORLISS. Have they reimbursed the Maritime Canal Company for that amount?

Mr. HITCHCOCK. I understand they reimbursed the old association for that amount.

Mr. CORLISS. How much stock altogether has been issued?

Mr. HITCHCOCK. I will give you the stock statement. It is found on page 58 of Senate Report No. 1418, Fifty-fifth Congress, third session:

Stock sold	\$1, 014, 500
Stock paid for concessions.....	12, 000, 000
Stock issued to Nicaragua.....	6, 000, 000
Stock paid for work.....	\$3, 199, 000
Less stock taken in liquidation.....	242, 000
	<hr/> 2, 957, 000
Total stock obligations.....	23, 471, 500

Mr. CORLISS. Who was that sold by, if you please; by the Maritime Canal Company?

Mr. HITCHCOCK. To different persons, by the Maritime Company. Stock paid for concessions, \$12,000,000. That stock remains in the treasury of the Construction Company. Stock issued to Nicaragua, \$6,000,000; stock to be issued to Costa Rica, \$1,500,000; stock paid for work, \$3,199,000.

Mr. MANN. Is that additional to the items which you have just stated to the committee?

Mr. HITCHCOCK. No, sir.

Mr. CORLISS. Have you now stated all the stock ever issued by the Maritime Canal Company?

Mr. HITCHCOCK. I am stating it. Stock paid for work, \$3,199,000.

Mr. MANN. You stated a minute ago that you issued twelve millions of stock to the Construction Company.

Mr. HITCHCOCK. Yes, sir.

Mr. MANN. Is that three millions in the twelve millions?

Mr. HITCHCOCK. No, sir. I am reading this for the purpose of explanation. Stock sold, \$1,014,500; stock paid to Construction Company for concessions, which they obtained through the association, \$12,000,000. Stock issued to Nicaragua, \$6,000,000. Stock to be issued to Costa Rica, \$1,500,000. Stock paid for work, \$3,199,000, less stock taken in liquidation, \$242,000, leaving stock paid for work, \$2,957,000. Total stock obligations, \$23,471,500.

Mr. STEWART. Can you cancel and surrender that stock?

Mr. HITCHCOCK. I understand, in round numbers, about a million and a quarter of the Maritime scrip for bonds and a million and a quarter of the Maritime stock, making two and one-half millions, is in the hands of third parties. The rest, aside from the Nicaragua and Costa Rica stock, I am informed, is in the treasury of the Construction Company.

Mr. STEWART. Did I understand you to say that you can not surrender two millions of this stock, in round numbers?

Mr. HITCHCOCK. One and a quarter million of stock and a million and a quarter in bonds that we should have to arrange to purchase from those who hold them.

Mr. STEWART. Do you know who they are?

Mr. HITCHCOCK. We have the list.

Mr. STEWART. Persons connected with the company?

Mr. HITCHCOCK. Some of them are; some of them are not.

Mr. MANN. Do you think you could cancel or surrender the bonds?

Mr. HITCHCOCK. Whatever Congress in its wisdom might see fit to do we should have to accept or decline; and if accepted, we should have to inform these people what it was best to do and what must be done.

Mr. MANN. Is it possible that you could surrender all of this stock, except the stock issued to Costa Rica and Nicaragua?

Mr. HITCHCOCK. I think it is possible; yes, sir.

Mr. CORLISS. Has any settlement of that kind been made in any obligatory form?

Mr. HITCHCOCK. I can't say that, but we have had a general meeting, which included many of the stockholders of both companies. It was held about a year ago, and it was the unanimous opinion that we were ready to undertake to do anything the Government would require.

Mr. HEPBURN. What was then understood to be the basis and adjustment of this settlement? Suppose the Government should give to the Maritime Canal Company \$5,000,000. Was it then understood that that should be divided up among the stockholders and bondholders?

Mr. HITCHCOCK. That was the understanding. There was no detailed plan, simply because, of course, that would anticipate further action on the part of the Government.

Mr. STEWART. Who prepared that statement upon which the \$5,000,000 was settled upon as the amount to be paid to the Nicaragua Company and the Construction Company?

Mr. HITCHCOCK. You refer to the Senate bill?

Mr. STEWART. Yes.

Mr. HITCHCOCK. I do not know who did prepare it.

Mr. HEPBURN. Under that outside agreement or arrangement, as I understand it, the man who had paid cash for his stock or his bonds, or the face value, if you please, would get the same percentage as the parties who held the twelve millions of stock that you gave for concessions, would he?

Mr. HITCHCOCK. Well, the third parties who own the stock and bonds I have spoken of, amounting to two and a half millions, unless they were disposed to compromise, could insist on the face value.

Mr. HEPBURN. I am asking you with reference to the understanding at that time.

Mr. HITCHCOCK. There was no special understanding, except the general feeling that we would be willing to do anything possible to aid and conform to any measure Congress might frame.

Mr. HEPBURN. If this plan should be established of giving the Maritime Canal Company five or five and a half millions of dollars, can you give this committee the assurance that the Maritime Canal Company could carry out the obligations imposed upon by you, we will say, the Morgan bill?

Mr. HITCHCOCK. I believe it could carry it out.

Mr. HEPBURN. Do you know it?

Mr. HITCHCOCK. No, sir; I do not know it.

Mr. HEPBURN. Whether you could do that? It would be dependent upon a great number of people, 800, I think you stated, other men?

Mr. HITCHCOCK. Yes, sir.

Mr. HEPBURN. And you are not authorized to speak for those 800 men?

Mr. HITCHCOCK. No, sir; except I was present at a general conference when that question came up and it was thought that, with the possible exception of the two and a half millions in the hands of third parties, the balance could be adjusted.

Mr. BARHAM. In that connection, I have understood, it has been stated before this committee, and understood to be the fact, that certain of this stock which is outstanding is in the hands of infants, guardians—belonging to the estates of deceased persons or persons whose whereabouts are unknown—and that it is impossible for you to surrender that stock or to have it canceled. Is that so?

Mr. HITCHCOCK. Of course, that I can't say; but what I do say is this: That the two and a half millions in the hands of third parties will be the only trouble, and it is fair to assume that if we receive an amount of money and put it up against these securities some arrangement could be made to satisfy and conform to any bill that might be passed.

Mr. BARHAM. My idea is that if the Government goes into it, it should have all of that stock. I want to know how you would get the stock standing in the name of deceased persons, or of infants, or of persons whose whereabouts you do not know. How can you get that stock and surrender it?

Mr. HITCHCOCK. We should undertake to get it with the expectation of getting it.

Mr. MANN. What assurance can you give us that that stock can be surrendered?

Mr. HITCHCOCK. Nothing except the opinion I have given.

Mr. SHERMAN. Did not the bill we reported in the last Congress provide for all emergencies of that character?

Mr. HITCHCOCK. I believe it did, sir.

Mr. CORLISS. You can not take away the vested rights of the stockholders.

Mr. HITCHCOCK. I understand that, and that is the two and a half millions I am speaking of, and we should expect to retire that.

Mr. BENNETT. I want to ask you just one question: In all the aggregation of figures that you have presented to the committee here this morning, you have not included one cent of interest, as I understand you?

Mr. HITCHCOCK. I am so informed—that the interest is not computed.

Mr. CORLISS. Are these your own statements?

Mr. HITCHCOCK. Not mine; they are made by the officers of the company.

Mr. BENNETT. And you do not believe that there is any interest computed in that expenditure for four and a half millions?

Mr. HITCHCOCK. That is my understanding. I was going to remark that, if I have said anything that reflects upon the Government of Nicaragua, or Costa Rica, or any criticism of the Senate and House on account of the bills which have been introduced and which we have sometimes thought impeded our work of raising funds, or if I have said one word that can be considered as an unfair criticism upon any other interest, I have done so without personal feeling in the matter, but have stated what I have had to say in my official character and as my official duty.

Mr. MANN. Did you tender to the first commission that came there under governmental direction the facilities established for making surveys?

Mr. HITCHCOCK. We did; yes, sir.

Mr. MANN. And also to the Walker Commission?

Mr. HITCHCOCK. Yes, sir.

Mr. CORLISS. Outside of the engineering question, I would like to ask you what is the view your company entertains concerning the Panama Canal?

Mr. HITCHCOCK. I will answer that question very briefly in this way: If you will look at the map and compare the two routes, I think you will reach the conclusion that the Nicaragua route is decidedly preferable for four reasons. In the first place, it is at the point of the lowest depression between the mountains of North America and the mountains of South America.

Mr. CORLISS. That was not the answer I wanted to obtain. What is your position in reference to the probability and the possibility of the Panama Canal Company finishing its canal, and what would be its effect on your canal if it does that?

Mr. HITCHCOCK. I am led to believe by engineers, whom I trust and who have looked over the matter carefully, that it will cost about four hundred millions of money to complete the Panama Canal, and when it is completed, under the present plans, it will be inoperative for the reason that there will be seasons of the year when they can not count on their system of storage to operate their locks.

Mr. MANN. By what report or by whom are you led to believe that?

Mr. HITCHCOCK. I would say that I have had frequent conferences with engineers and have been in communication with some of the engineers De Lesseps employed on that route, and then we have had our own trusted engineers examine it very carefully.

Mr. MANN. You are aware that the Panama Canal Company had a hearing before this committee this week and made the statement that the canal was two-fifths finished and that the balance of the entire work could be constructed for \$100,000,000, and that it was able to obtain the money. Of course, each of the companies has somebody in its favor, but it is very important that the members of this committee should have any information upon that subject that we can get, and, for one, I should be very glad, if you have any information in regard to the Panama Canal and what it would cost to finish it, if you will let us have it.

Mr. HITCHCOCK. I have had conferences with engineers who have said to me that it would cost four hundred millions to build it and that it would be inoperative when completed.

Mr. CORLISS. There is no definite information of that sort on file, is there?

Mr. HITCHCOCK. I acknowledge my information may seem indefinite; but it is all I have, and I rely upon it, because it comes from my trusted engineers.

Mr. CORLISS. Would any of them make a statement to the committee?

Mr. HITCHCOCK. I don't know that they would. Some of them are out of the country now. I will proceed with the reasons I was giving why the Nicaragua Canal route was preferable. In the second place, at the summit level there is a lake of 3,000 square miles, with a great river flowing from it, which will furnish twenty times as much water as can ever possibly be used. That is the second point. The third

point is that it is in the center of a great rainfall, thus securing an unfailing supply of water. Fourth, it is in the line of trade winds, and this depression enables those trade winds to sweep across the country, and the climate is healthy. In our hospitals, at the time when 1,500 men were at work there, the percentage of deaths was less than in any hospital in the United States.

Mr. BENNETT. Isn't the Nicaragua route shorter than the Panama route?

Mr. HITCHCOCK. Yes, sir; 400 miles shorter.

Mr. BENNETT. The Panama route is within the region of equatorial calms, isn't it?

Mr. HITCHCOCK. Yes, sir; it is.

Recess until 2 p. m.

STATEMENT OF PROF. LEWIS M. HAUPT.

Professor HAUPT said:

Mr. Chairman and gentlemen of the committee, I esteem it an honor to be able to present a few points in regard to this matter of the construction of the Nicaragua Canal. I know you have been burdened by a mass of technical details, so that I do not flatter myself that you will be especially interested in that branch of the subject, but it seems to me that there are some considerations which your committee will have to take up of necessity, and they are of far more weight—

A MEMBER. Are you connected with the Maritime Canal Company?

Professor HAUPT. Not in any shape or form.

The MEMBER. You are simply interested in the progress of a canal?

Professor HAUPT. Yes, sir; simply as an American citizen. I have not any connection with the company nor have I ever been employed by them.

The MEMBER. And you have no prejudice—

Professor HAUPT. No interest whatever.

The MEMBER. For one company over another company?

Professor HAUPT. No, sir; nor any stock, nor any interest in any of the concerns. But I have given a great deal of attention to the subject of interoceanic canals from the standpoint of an American citizen and also from the standpoint of an engineer.

It seems to me if we were in a state of war we would immediately deliberate on this very important question with closed doors, and the questions involved in commercial contests are of even more weight and of more importance than the questions involved in war. This question is one of more importance to this Government than to any other government in the world, although it does affect all governments and will certainly have a very material effect upon the commerce and prosperity and civilization of the world as well as upon this country. Consequently, it is one of supreme importance and one that deserves a great deal of careful consideration.

The history of the enterprise has shown that it has been made a matter of strategy and diplomacy for many years, at least fifty years in this country, and probably for four hundred years, from the time this continent was discovered.

I feel, sir, that this is a very critical moment in the history of this entire enterprise; that should Congress take no action during this session it will revert again to the field of diplomacy, and I believe that

because it has so long been in that field we have failed to make more material progress in the construction of this canal.

Looking upon it from what might be called a commercial strategical standpoint, we must recognize that there are certain vested rights which will be affected by the opening of this canal, and that that is a necessary incident to the development and progress of all great works, and that the greater the work the greater the opposition. It is upon that point I wish to say a few words.

Unquestionably the foreign powers will be affected by the opening of such a canal. Their commerce will be very much affected. At present they have a monopoly of the Oriental trade. The opening of this canal would bring this trade into much closer touch with the United States than anything else that could happen on the face of the globe. The countries that have that monopoly are not anxious to give away a large portion of the trade without apparent consideration. The edge of this blue sheet of paper here will give an idea of what is called the transportation divide between Suez and Nicaragua as affecting the ports of New York and Liverpool. It shows by the opening of this canal across Nicaragua or across the Isthmus of Panama, whichever it may be, that it will place at the disposal of the United States the whole of this great Oceanic country, a large portion of China and Japan, and the eastern terminals of Russia in Asia. [Indicating on map.] In other words, it will give us a fair chance for a trade of over 5,000,000 square miles in the commerce of the world. That is a very important point to consider, and naturally we would expect opposition to the removal of the barrier which now prevents us from going into that territory to any considerable extent. I therefore think that the opening of that canal will do more to promote the welfare, prosperity, and happiness of this country than any other engineering problem possible on the face of the earth.

Now, with reference to another vested interest that is opposing the canal. It is currently reported that the transcontinental railroads of this country are opposed to the canal. I wish to say upon my individual investigation, having studied that question, that I believe there is nothing that will do so much to promote the business of the transcontinental railroads as the opening of this canal. It perhaps seems to be a paradox, but nevertheless it is true. It does not mean a division of territory or a division of traffic. The policy of railroads generally has been to encourage immigration, to establish colonies, to establish population, and many railroads have gone so far as to offer bounties to people who will settle in their territory. They do that for the purpose of getting the outcome of their labor, and there is nothing that will so develop the Pacific coast as the opening of this canal. It is the best colonizing element we can conceive of.

It is a fact that wherever a railroad is paralleled by a deep waterway, that railroad is in this condition. Look over the quotations of the stock markets to-day. You will find the stocks of those roads are quoted above par that have the advantage of such waterways, and those railroads which are not paralleled by any deep waterways are almost uniformly the roads whose stocks are selling below par. The reason for that is manifest. The New York Central and Hudson River Railroad, which is practically hemmed in by mountains or high hills, was constructed after the river was established—long after, of course—the river already having an enormous traffic, and yet it was found to be expedient to build that railroad along those rugged shores for the purpose of the business that the river and the Erie Canal had created. And it is also patent to everyone who will look into it that the Lake

Shore and Michigan Southern Railroad, which parallels Lake Erie, is doing an excellent business, and is one of the best paying roads in the country. It is helped by the deep waterway which parallels its line.

If you take the New York and New Haven road along Long Island Sound you will see that the same argument applies; or take the Old Colony Railroad, or the Boston and Maine Railroad, or the Atlantic seaboard railroads generally, and you will see that they are all doing a good business.

Therefore I believe that the construction of the Nicaragua Canal will be bound to be of great benefit, not only to the railroads but to the whole country. If it should not be beneficial to the railroads it would certainly develop the other interests, and they are in the aggregate, I think, superior to the railroad interests. But my position is that I am in favor of this not to benefit any one interest, but because it will be for the general benefit of the country. On that point I would like to submit letters from the worthy president of the New York Central and Hudson River Railroad and others. There are a few railroad presidents who are willing to acknowledge the truth of this statement. I will read this letter from Mr. Chauncey M. Depew. He says, under date of January 6, 1896:

NEW YORK CENTRAL AND HUDSON RIVER RAILROAD COMPANY,
Grand Central Depot, New York, January 6, 1896.

DEAR SIR: I am in receipt of yours of January 3. I have always thought the existence of the Erie Canal a benefit to the New York Central Railroad, and have therefore favored every movement which liberalized its management or promoted its interests.

Yours, very truly,

CHAUNCEY M. DEPEW.

S. A. THOMPSON, Esq., *Chicago, Ill.*

CHESAPEAKE AND OHIO RAILWAY COMPANY,
Cincinnati, Ohio, January 4, 1896.

DEAR SIR: I have yours of the 3d. I am not aware of any appreciable injury to the Chesapeake and Ohio from the improvement of the Kanawha. On the other hand I should rather think it would help it. Improvement of the waterways always helps the railways, for the development of the waterways makes business, and the railways then get the higher-class freight.

Yours, truly,

M. E. INGALLS, *President.*

S. A. THOMPSON, Esq.,
118 La Salle Street, Chicago, Ill.

THE CANADIAN PACIFIC RAILWAY COMPANY,
Montreal, October 9, 1894.

DEAR MR. STEWART: I have your letter of the 6th. A canal by way of the Ottawa River and Lake Nipissing to Georgia Bay would not, in my opinion, injure the Canadian Pacific in the least. I expressed my views on this subject a year or two ago to the Hon. Mr. Quimet, who, I think, will remember them and will be able to set at rest any fear of opposition on my part.

Yours, very truly,

W. C. VAN HORNE.

MCLEOD STEWART, Esq., *Ottawa.*

I might go on quoting almost ad infinitum. I might show you from the history of other countries—France, Holland, Belgium, and so on—how benefits have accrued to railroads from the opening of deep waterways. But I will not take time to go into that further.

The National Board of Trade, in its meeting in December in this city, took official action in regard to this matter. They adopted resolutions in favor of the opening of the canal. I believe they are on record in your minutes, and I would beg leave to call your attention to the same at the proper time.

I have just received a telegram from Mr. Theodore Search asking that I deliver a speech in Cincinnati next Wednesday on the matter of the Nicaragua Canal. I have uniformly declined these invitations pending the preparation of our report, but it merely tends to show—these telegrams and many other invitations I have received—that this is a national question, one of vital importance; and I think I can say, from the conversations and letters that have reached me as a member of the commission, that this proposed enterprise is exciting a great deal of interest throughout the whole United States; that throughout the United States the people are anxious that the nation should take possession of and control the Nicaragua Canal. I very much fear that if at this session of Congress some decided action is not taken the enterprise will take its place again in the field of diplomacy, where it has been for so many years. That is the great danger that faces us to-day.

I do not know whether you wish me to go into the relative merits of the trans-Isthmian routes. As a member of the commission I would say we performed our duties faithfully, I think. We went to Nicaragua and examined the route, going over a large portion of it on foot or in vessels, and also had a pretty good opportunity of making an examination of the Panama route. We were very much impressed with the character of the work done there and with the fidelity with which they are making an effort to secure results; and it must be patent to everyone that the French Government, having put \$260,000,000 already into the enterprise, naturally feels that she does not want a competitor, and it is perhaps proper that she should feel that way and make her presentation here in favor of procrastination.

MR. BENNETT. Do you think the Panama Canal will be constructed?

Professor HAUPT. It is a physical possibility. The greatest difficulties are the financial and diplomatic questions. Those are the questions. The physical difficulties can be solved at Panama.

In the matter of cost, taking the statement that has been made here that two-fifths of the useful work has already been done at a cost of \$154,000,000, it is simply a matter of arithmetic to figure that if that is 40 per cent, the remaining 60 per cent, costing in the same ratio, will be done at the expenditure of somewhere in the neighborhood of \$240,000,000. And that is the cheapest part of the work. That will give you some little idea of the cost of that part of the work exclusive of construction, such as dams and locks, and I think that will be a fair estimate to place upon it.

There are other physical difficulties, which I do not care to dwell upon just now, unless you desire me to do so.

MR. MANN. The statement made here was that there had been \$88,000,000 spent on the actual work. The rest of the \$154,000,000 was spent for machinery, and the assumption was that the remainder was spent dishonestly.

Professor HAUPT. If you include that, then their total is \$264,000,000.

MR. MANN. I am taking it from the book you had reference to. The statement was that \$154,000,000 had been spent; \$88,000,000 on the work.

Professor HAUPT. Even on that basis it could not be finished for

\$100,000,000. To compare the two routes, the Panama and the Nicaragua route—in the first place, it is claimed for the Panama route that it is only one-fourth the distance of the other route. It is 46 miles long, they say, as against 180 miles for the Nicaraguan route. I do not think that is a fair comparison. In the 180 miles, the distance set down for the Nicaragua route, there is an interior sea and a large river which can be improved and made navigable. In our project we have been figuring on a channel of about 300 feet bottom width for a distance of about 70 miles, and there are about 70 miles more in the lake. Altogether, the amount of canals in the Nicaragua project, when they are figured down, will probably be less than half the amount of canalization required on the Panama route.

There is the further objection against the Panama route that for all north-bound terminals the termini are 450 miles farther.

There is the further objection that the Panama route will require an artificial lake for the regulation of the Chagres River, whereas nature has produced a magnificent fly wheel in Lake Nicaragua, covering 3,000 square miles, which prevents any floods there. The only danger is from the San Carlos, but we believe, from examinations that have been made and are now being made, that it is possible to eliminate that danger entirely by building a dam at Boca San Carlos. We believe, also, that better harbors can be made—or at least I believe so—at the Nicaraguan terminals than exist at the Panama terminals.

The harbor at Colon is a good harbor in quiet water, but in storms it is necessary for vessels to weigh anchor and go to sea. At the La Boca terminus it has been necessary to dredge a channel $3\frac{1}{2}$ miles in length, and through rock a portion of the way, in order to reach a landing pier. That would be unnecessary entirely on the Nicaraguan route.

Those are some of the physical features of these two projects.

Mr. BENNETT. And in relation to the trade winds?

Professor HAUPT. The trade winds are quite constant in Nicaragua, while we have the doldrums at Panama. The rainfall is heavy at Nicaragua and comparatively little on the west coast—

Mr. BENNETT. How about the rainfall at Panama?

Professor HAUPT. At Panama it is heavy on the east side of the Cordilleras. That precipitates the rain of the western side, which is much more heavy. The difficulty about rainfall has been very much exaggerated. We were surprised to find that the erosion due to rainfall is very slight indeed. Banks stand almost vertical and do not show much wear on account of the rain. There does not exist there the destructive element we have—frost. In that country the thermometer does not vary 30 degrees during the year. In some parts of the United States we have a variation of 150 degrees.

I was surprised with the plant that I found there. There is no appreciable deterioration in the rails of the railroads. I measured it, and I found there was no appreciable loss. Some spikes which I picked up there on the road were apparently almost as good as when they were put down.

Mr. BENNETT. Did you make any special investigation of the moving of the sand at Greytown?

Professor HAUPT. I made that especially, and I can confirm the studies made by Prof. Henry Mitchell, in which he stated that the material moved on the outer part is about 160 cubic yards a year, and it is entirely practicable to control that by building a jetty to arrest its movement.

Mr. BENNETT. How many miles would that have to extend out to sea?

Professor HAUPT. About one-third of a mile, I think. That will create a large impounding basin, which will arrest the sand for a mile and a half. The building of a 1,000 foot jetty, which was built by the canal company, has served to arrest those sands for a distance of nearly a thousand feet, causing a neutral point. In the report of the Ludlow board it was proposed to make that their point of egress and ingress.

Mr. STEWART. Would that be on the principle of the Eads jetty?

Professor HAUPT. Not exactly. The main purpose at Greytown will be to arrest the lateral movement of the sand, and that can be done at very small cost, and the harbor will be an interior harbor in all probability. We are now considering the possibility of a line directly across here [indicating on map].

Mr. BENNETT. As a matter of fact, Professor, what portion of Costa Rica comes into direct contiguity to the canal?

Professor HAUPT. On the Lull route none of the canal comes within the Costa Rican territory.

Mr. BENNETT. Would the overflow interfere with Costa Rica?

Professor HAUPT. Yes, sir. Any dam across the river will interfere. The Ochoa dam will flood a large portion.

Mr. BENNETT. There is no flow to the sea, then, through the San Francisco or other basins?

Professor HAUPT. No, sir. They are all tributaries of the San Juan, and that water is carried off in the main body of the stream.

Mr. MANN. What is the boundary line there between Costa Rica and Nicaragua?

Professor HAUPT. The boundary line has just been situated, I believe, by an arbitration. They have located the line below Viejo Castillo to be the right bank of the river, following around what is known as the harbor head lagoon until they strike a point at sea nearly a mile north of the Tailro River, which is one of the delta branches of the San Juan. When dams are placed in the river a large portion of that would no doubt be covered by water.

Mr. MANN. Is it necessary to have the concession from both Governments?

Professor HAUPT. Yes, sir.

Mr. MANN. Absolutely?

Professor HAUPT. I should say so.

Mr. BENNETT. On account of the overflow upon the land of Costa Rica?

Professor HAUPT. Yes, sir. It will certainly interfere with property rights, and with their right to navigation, and so on.

The CHAIRMAN. Where would those rights be located—above the site for that Ochoa dam?

Professor HAUPT. Yes, sir; a portion of them. If the Ochoa dam is placed as proposed, it will be below the mouth of the San Carlos River.

Mr. BENNETT. That is the Lull route?

Professor HAUPT. No, sir; the Menocal route. The Lull route follows the river. In every case there would be trespass upon the territory of Costa Rica. This San Carlos River [indicating on map] drains a very large territory, and is an avenue of communication by means of small boats and canoes.

Mr. HAWLEY. In making your survey did you find much preliminary work had been done?

Professor HAUPT. Yes, sir. We found preliminary work had been

very thoroughly done. The topographical maps were well done. They were on a scale of 400 feet to the inch. They were very complete. We verified every portion of them, and our contours corresponded very closely with those maps already made, showing that the topographical features were very thoroughly done. Their borings were quite accurately confirmed by our borings, and the statement is confirmed in the Ludlow report, that they have done the equivalent of about sixteen years' work for one surveying party, which means a great deal of examination. There are very few projects that have been as thoroughly exploited as this one.

Mr. HAWLEY. Who supplied you with these maps?

Professor HAUPT. They were supplied by the Nicaragua Canal Company. They have put all their data at our service.

Mr. HAWLEY. Did they supply you with any additional facilities?

Professor HAUPT. No transportation facilities, but everything that was necessary—

Mr. HAWLEY. I mean facilities that were necessary.

Professor HAUPT. Yes, sir. Borings, and everything of that kind; and also they gave us the names of individuals—gentlemen who were familiar with the work done—and they gave us the use of their houses at Greytown. Everything they had was placed at the disposition of the commission.

Mr. HAWLEY. You found there the basis for the work you wanted to do, which would have cost time and money both?

Professor HAUPT. Yes, sir. It enabled us to lay out our work and systematize it, and it has saved us a great deal of time which would have been otherwise occupied in exploitation—experimental work. We were able to divide our parties up and to assign them to certain sections and parts of the work, and to conduct it thereby more rapidly than would otherwise have been the case.

Mr. HAWLEY. Has the force on the Pacific side finished its work?

Professor HAUPT. Yes, sir. All the parties are in, with the exception of a few persons who are making examinations as to rainfall and one party making an examination as to the possibility of a new dam site.

Mr. BARHAM. Is there any doubt in your mind about the feasibility of the Nicaragua route?

Professor HAUPT. No, sir; none whatever. It is a possible, practicable engineering project.

Mr. BARHAM. Do you think the canal can be constructed within \$140,000,000?

Professor HAUPT. Yes, sir; and for much less money, in my judgment, if it is under proper management.

Mr. BARHAM. If you put it under the War Department of the United States do you think it would not cost over \$140,000,000?

Professor HAUPT. I think not, sir.

Mr. HAWLEY. Before you go, Professor, I would like to ask you one more question. You spoke of the facilities of the various kinds which were offered you there by the Maritime Canal Company. In what condition did you find their property, their machinery, and all the paraphernalia which they had constructed there for the purpose of building this canal?

Professor HAUPT. The houses built of wood are not in good condition because of the insects which are found in that country. They have roaches there 3 inches long, which eat into the wood. They are borers. These insects have so eaten into the wood of the hospital building that it is in a very shaky condition. But the ironwork, and machine shop, and tools, and everything of that kind are in good condition.

Mr. HAWLEY. And those things are the more valuable?

Professor HAUPT. Yes, sir; they have maintained those things and kept them up pretty well for the purpose of maintaining transportation on the river, and they are used by Pellas. The dredges, however, are not in good condition and they are antiquated. I do not think it would pay to rebuild or improve them, because great advances have been made along that line in recent years, and it would be better to buy new dredges.

Mr. MANN. Have they any great amount of property on the ground now? I mean in value.

Professor HAUPT. Not very much at the Greytown end. The railroad is probably the most valuable property they have. Eleven miles of that is still in good condition.

Mr. BARHAM. If the Government of the United States would undertake to build this canal, what is your opinion of the value of the work which has been done there by the Maritime Canal Company in aid of the construction of the canal?

Professor HAUPT. That is a question which we were not called upon to pass upon in our instructions, and to which we have given no consideration. I would not like to answer the question offhand without an estimate.

The CHAIRMAN. If the Lull route should be adopted, how much of the river will be canalized or utilized?

Professor HAUPT. In every case, 70 miles of the river will be slack water. From there down [indicating on map], if the Lull route is followed, about 30 miles, perhaps 40 miles, of the river would have to be canalized by a system of dams similar to those on the Monongahela River; and from there [indicating on map] it is proposed to cut through some lagoons to the sea.

The CHAIRMAN. What will that distance be? I mean the distance from the point where you cease to canalize the river.

Professor HAUPT. I should say between 11 and 12 miles.

The CHAIRMAN. Will that be a sea-level canal?

Professor HAUPT. Yes, sir. I should say that this is where the Atlas Company is now building a railroad for portage, so as to provide transportation in times of drought. There is difficulty in getting the boats around. They now have that concession.

Mr. BENNETT. Is there a passenger line to Brito now?

Professor HAUPT. Not to Brito. There is a passenger line that reaches the west coast.

Mr. BENNETT. I mean from the Atlantic to the Pacific, practically.

Professor HAUPT. Yes, sir; there is a landing at Grenada, and railroad communication from there to Corinto.

Mr. BENNETT. How long would it take to travel over that distance?

Professor HAUPT. The trip is made in about three days, sir, in ordinary stages of the river.

Mr. HAWLEY. What was the purpose of displaying that map of the Pacific Ocean?

Professor HAUPT. This map [indicating] was for the purpose of showing another feature, which I have not gone into. I intended to show by this that if this canal is opened it will not be a question of leaving our coast at Nicaragua and going direct to the Orient, but that the shortest sailing route, as shown on this map, is by the coast route, passing along here, by San Francisco [indicating on map]. That would of necessity develop all this coastwise business. The route would be by this circle [indicating], which is the shortest one. The distance is nearly 800 miles shorter in favor of this route by way of San Francisco.

The CHAIRMAN. What is the difference in distance from New York to Hongkong by way of the Suez Canal and by way of the Nicaragua Canal?

Professor HAUPT. About 300 miles difference. The transportation divide is near Hongkong, so it is practically an even thing. It would simply be controlled by rates of tolls, and so on.

The CHAIRMAN. Three hundred miles difference in favor of which route?

Mr. HAUPT. In favor of the Suez route.

The CHAIRMAN. What would be the distance to the principal points in Japan, comparing the two routes?

Professor HAUPT. They would be nearer to New York by way of Nicaragua. But if you make New Orleans the terminus, then it makes the Nicaragua route 2,000 miles nearer, or extends our transportation in market range 2,000 miles farther to the westward.

Mr. HAWLEY. What is the difference in distance from London to Yokohama?

Professor HAUPT. It is about the same as from Liverpool.

Mr. HAWLEY. Well, I mean from Liverpool.

Professor HAUPT. It is about the same from either of those terminals as from New York. Yokohama is much nearer New York by way of Nicaragua than London is from Yokohama; 1,500 miles nearer.

Mr. HAWLEY. You have answered the main question in stating it is 2,000 miles nearer by way of Nicaragua to Yokohama than the other way; that is, counting from New Orleans?

Professor HAUPT. Yes, sir.

Mr. MANN. Did I understand you to say it was 800 miles nearer by way of the great circle to Hongkong than by the way of the Hawaiian Islands?

Professor HAUPT. Yes, sir. It is 800 miles nearer by way of San Francisco [indicating on map].

Mr. MANN. From Nicaragua?

Professor HAUPT. From Brito; yes, sir.

Adjourned.

GRACE, EYRE-CRAGIN SYNDICATE.

WEDNESDAY, *January 18, 1899.*

The committee met at 10.30 o'clock a. m., Hon. William P. Hepburn in the chair.

Mr. BENNETT. This meeting was especially called for a hearing on the part of Messrs. Edward Eyre and Edward F. Cragin, representing the construction of the Inter-Oceanic Canal. I wish to present Mr. David McClure, the counsel for the Grace syndicate, so called.

The CHAIRMAN. Let me suggest that you will have probably an hour and twenty minutes, and you may divide that time to suit yourselves.

STATEMENT OF MR. DAVID McCLURE, COUNSEL FOR THE SO-CALLED GRACE SYNDICATE.

Mr. McCLURE said:

Mr. Chairman and gentlemen of the committee, I come here by the direction of the syndicate which has the concession known as the Eyre-Cragin syndicate, in response to the very polite suggestion of this committee that there should be presented to it, and through it to

Congress, the positions which the different parties having, or claiming to have, concessions from the Nicaraguan and Costa Rican Governments hold. And the syndicate which I represent is very prompt and anxious that the committee should be well informed as to not only the position which it at present occupies, but the reasons which induced it to obtain that position.

In the first place let me say that the syndicate in question is one made up of very substantial gentlemen, most of them residents in the city of New York; all of them men of very large means; all of them citizens having the highest aspirations for the country's progress, and some of them have already shown a very great interest in the welfare of the country; and they are entering upon this project of building this canal without any help from anybody, as they would enter upon any matter which has been inspired by a desire to advance the interests of the country.

And I am permitted to present to this committee, and I think it desirable that the committee should know that this is not a body of gentlemen who have bought something to dispose of in any way, but a body of gentlemen who deliberately, knowing of the difficulties in the way; knowing the large expenditure which was absolutely necessary; knowing of the delays which have been caused by the fact that perhaps there has not been as much of means as was necessary to go on with the work, have come together, determined to carry on this work. And they are these gentlemen:

W. R. Grace (W. R. Grace & Co.; Ingersoll-Sergant Drill Company); J. D. Crimmins (Metropolitan Traction Company; City Trust Company); Hon. J. A. McCall (president New York Life Insurance Company; New York Security and Trust Company); E. R. Ladew (United States Leather Company; Fayerweather & Ladew); Hon. Warner Miller, ex-United States Senator (International Paper Company); H. B. Hollins (H. B. Hollins & Co.); W. D. Sloane (W. & J. Sloane); E. J. Berwind (Berwind-White Coal Company); B. M. Shauley (Jersey City Traction Company); J. H. Ladew (United States Leather Company; Fayerweather & Ladew); Col. J. J. Astor, New York; George Westinghouse (Westinghouse Electric and Machine Company; Westinghouse Air Brake Company); D. O. Mills, New York; Hon. Levi P. Morton, ex-Vice-President of the United States (Morton, Bliss & Co.); M. P. Grace (W. R. Grace & Co.); Robert Goelte, New York; H. M. Rogers (Standard Oil Company); G. G. Williams (president Chemical National Bank); G. T. Bliss (Morton, Bliss & Co.); James Stillman (president National City Bank); G. G. Haven (vice-president Mutual Life Insurance Company); James T. Woodward (president Hanover National Bank; president New York Clearing House Association); H. S. Kerr (Redmond, Kerr & Co.); W. H. Gelshenen (president Garfield National Bank).

Now, Mr. Chairman and gentlemen of the committee, this syndicate was organized under circumstances which appear to them to warrant their conclusions that there was absolute necessity for the building of this canal, and that at the time they organized and made their effort to obtain the concession which was obtained there was no immediate prospect of the canal being otherwise built. They deliberately examined into the situation. They found out that work had been suspended for some years on the canal, and it seemed as if almost by mutual consent of the Governments of Nicaragua and Costa Rica, and the canal company holding the concessions, that the work was not to go on; but they investigated that matter physically as business men, not desirous—they were not desirous, and they are not now desirous—of trenching

upon the rights of anyone, and they do not seek to have any impediment put in the way of any company which began and had a right to build this canal.

But they investigated the matter as they would the advisability of investing in any business matter, as they would investigate any business matter in which they were imperiling a large amount of money, because of course it is understood here throughout that the building of this canal involves a great deal more than \$100,000,000; and, as prudent men, most of whom—all of them, I should say—have made their own fortunes, they investigated this matter carefully. They sent their engineer, a man of much experience and ability, who is here with me to day, and he examined the whole property as to the ability of this syndicate to build the canal.

They investigated the conditions of the concessions which had been existing, and it was found, as a matter of fact, that the Government of Nicaragua had proceeded with a great deal of deliberation, going to the extent, which perhaps may not be generally known, of summoning a body of lawyers constituting an extraordinary judicial tribunal, where the question of the determination of a previously existing concession was discussed and passed upon. And then that body, this syndicate which I have the honor to represent having nothing whatever to do with the transaction, and declining to and abstaining from entering into any negotiations or arrangements with the Government of Nicaragua until that Government should, without any pressure from anyone else, decide what its governmental position was with reference to this canal project—this extraordinary body I speak of deliberated for a long time, having before them, as I understand, not only the concession but the correspondence, which was very considerable, and, after weighing the whole thing, reached the conclusion that the concession which had been existing would expire in October, 1899. The Government of Nicaragua having so decided, then this syndicate, desirous of entering into the building of this canal, said:

Upon the determination, as you do determine that there shall be after a certain day of October, 1899, no then existing concessions, we will take from the Government of Nicaragua a concession which will commence at that time.

And as I say, entering upon the field where it appeared that honorable entry might be made, that any concessions which had existed seemed to have been determined, then the concession which this syndicate possesses was obtained; and that concession is liberal in its terms, too, as you gentlemen of the committee will see, because the very first paragraph authorizes the arrangement by this concession of the concessors named in this concession with the Menocal concession holders for the determination or cessation of that prior to October, 1899, so as to leave it so, if there is any interest which remains prior to October, 1899, and if you desire to make an arrangement and to terminate that arrangement prior to October, 1899, you may do so.

That paragraph, Mr. Chairman, is the very first one, if I remember correctly.

Mr. HINRICHSSEN. The last page.

Mr. MCCLURE. And the first, too. It is on page 35 of the Senate papers—"to negotiate." And I have no doubt, although that matter has not been a subject within my instructions, that this body of gentlemen, whose names I have read to you, would be perfectly willing to make any arrangement that would be proper under the circumstances to make, to dispose of that interest if the parties should see fit to meet upon the question.

Mr. Chairman, that is so much as to the entering into this question by this syndicate. They have secured this contract, and it is valuable. Whether it becomes the property of the Government or whether it becomes a matter directed by a Government, it is a very valuable contract. In the first place it is a contract in perpetuity. There is no determination to it. It goes on forever, with all of the value which comes from continued use. It is very large in that regard. It differs from other concessions in that respect. It gives the power to the canal company which shall be formed—the Inter-Oceanic Canal Company referred to in this concession or contract. I should not call it a concession because you will notice it is not a concession; it is only a contract for a concession to commence in October, 1899. The Government of Nicaragua did not make a concession, simply a contract that a concession would commence at the expiration of the time fixed.

The CHAIRMAN. Does that commence without further action upon the part of either party?

Mr. McCLURE. It provides, if you please, that there shall be no necessity for further action. It is one of those contracts often made, for instance for a lease, to commence some months ahead, which shall at that time have the effect of the lease itself. It embodies in it all the provisions of the concession, and then it provides—

The CHAIRMAN. Just a moment there. Does it retain to the Nicaraguan Government the right to extend the contract or the concession with the Maritime Canal Company after the 9th day of October, 1899, supposing they should desire to do so?

Mr. McCLURE. No, sir.

The CHAIRMAN. Under your contract could the Government of Nicaragua extend that concession if they so desired?

Mr. McCLURE. No, sir; this is an exclusive contract. This is a contract for an exclusive cession. It declares in terms that there will not exist after October, 1899, any other concessions.

Mr. MANN. Do you mean that there is no further action required by any portion of the Nicaraguan Government?

Mr. McCLURE. That is provided, sir. Article 41 says:

It is understood that for the purposes of this contract the Cardenas-Menocal contract shall cease to have legal existence on the 9th day of October, 1899, and, therefore, all the foregoing stipulations shall take effect without further action, declaration, or law, on the 10th of October, 1899, or sooner—

The CHAIRMAN. From what are you reading?

Mr. McCLURE. The concession. I will find that in the report.

The CHAIRMAN. We have the concession before us.

Mr. McCLURE. It is on page 19, article 41. (Reading)—

shall take effect without necessity of further action, declaration, or law on the 10th of October, 1899, or sooner should Messrs. Eyre and Cragin, their heirs or assigns, obtain the rescission of the Cardenas-Menocal contract. In this latter case it shall be sufficient that said Eyre and Cragin, their heirs or assigns, should notify the Government in writing, inclosing the document or documents that prove the rescission.

Mr. STEWART. Don't you consider this to be a violation of the former contract or concession of the Maritime Canal Company, wherein it is declared that if they show that they have been prosecuting the work on the canal in good faith the Nicaraguan Government will renew the concessions to them for ten years?

Mr. McCLURE. I do not; and if we had so considered we would not have entered into this contract.

Mr. STEWART. You have read the concession?

Mr. McCLURE. Yes, sir.

Mr. STEWART. You know the provisions of it?

Mr. MCCLURE. Yes, sir; I am very familiar with it.

Mr. STEWART. Don't you consider that your contract is in violation of that—

Mr. MCCLURE. No, sir; I do not, for this reason. I find in the Senate papers here, and in fact it is apparent, a confession under the examination of Mr. Hitchcock, the president of the Maritime Canal Company, that no work whatever had been done since 1893. It would appear from other papers in the case that indeed no work has been done since 1889 or 1890, and that therefore the stipulation to which the member of the committee refers would not apply where work was progressing with ordinary rapidity and a large amount of money had been expended, and it was found by reason of something that had not been anticipated or something such as may come in any work—strikes or other things—that the work was delayed beyond the power of the contractor; then it might be considered that the work was proceeding with diligence, with ordinary fair diligence; and if the limit of time should then be reached, then the Government of Nicaragua, like all fair-minded contracting parties, would say: "The spirit of this contract is being performed, and we will not take advantage of the letter, and will say to you that you may go on, and the time will be extended in accordance with the necessities of the case."

But I have read with a great deal of care, and I presume you gentlemen have too, the matter appearing in the report of the Senate committee—the letters, the statements, the examinations had before the committee of the Senate—and I find that the work that was done in this case seems to have been ended with 1889, and possibly 1890. This Maritime Canal Company—and I want you to understand I am only discussing this because I am asked, and I have not anything but the kindest of feeling, I mean not only personally, but representing the syndicate—

Mr. BENNETT. There is no sentiment in this at all.

Mr. MCCLURE. None at all. It seems they got into difficulties. The difficulties were so great that even the property of the construction company, because this work was done by a contract with a construction company, and the Maritime Company itself, as I understand it, never had any particular assets except this franchise; they bargained with a construction company to complete this work, as is usually the case, and they were to pay for it by the stocks and bonds of the Maritime Canal Company. The construction company got into difficulties, and did not pay its obligations, and I find in these papers noticeably, and you will notice it in the statement of the chairman of the committee, that the tools and plant of the construction company were seized for debts that were enforced through the courts of the Republic of Nicaragua, the Government of Nicaragua itself having nothing whatever to do with the construction, but those debts being enforced through the courts, as its courts are open under our concessions, being open for everybody who has any claim against anybody building the canal. As a result of this, this property was seized.

The CHAIRMAN. When?

Mr. MCCLURE. It was seized, Mr. Hitchcock says, and you will find it on page 75:

The Maritime Canal Company of Nicaragua is and always has been entirely solvent. There is no outstanding debt we are not able to meet. Anyone making a different statement confuses the Maritime Canal Company with the construction company which held a contract to construct the canal, and which was obliged to suspend operations in 1893.

And in another part of the paper it appears that the Maritime Canal Company complains that the courts of Nicaragua in the matter of process had taken some of its property for the debts of the construction company, mistaking it, probably.

Recurring again to the question, which has been put to me by a member of the committee, as to whether we think this present concession is in violation of that provision of the former concession; I look at that, gentlemen of the jury, as an ordinary contract. If a house was being built for me, and I should say, "Although the contract is to have it built by the 1st of May, if you go on promptly and do not have it ready by the 1st of May, all right; if you are putting a lot of money into it, and are going on with the work, I shall not forfeit that." But if, instead of building my house for a year, it had gone on for three or five or seven years, and if the derricks, which were to lift the bricks to the second floor, had rotted and fallen to the street, and if the plant generally had disappeared and no money had been put into it, I, in my own interest, would think it was necessary—

Mr. MANN. Will you answer me this question. On page 20, it says:

Resolved, To approve it in all its parts and to submit it to Congress for its ratification.

And below that it says:

Done in the hall of sessions, in the national legislative assembly of the State.

Is the national legislative assembly of the State the Congress you refer to?

Mr. McCCLURE. Yes, sir.

Mr. MANN. And is the "Done" there the ratification?

Mr. McCCLURE. Yes, sir. And then you will find this approved by the president afterwards.

Mr. MANN. This says all the time "the promise of a contract."

Mr. McCCLURE. I want to make myself clear on that. A contract which the Government of Nicaragua, by Congress, passed—a contract that a cession shall commence in October, 1899—is a cession and contract to-day, and in his approving of it is the giving of the right; and here this provides that no further action shall be necessary than this.

Mr. MANN. But it says it is a promise of that.

Mr. McCCLURE. But it says that this shall mature into a contract.

Mr. MANN. I do not want to quibble. This says that it is a promise of a contract. Has this ratification by Congress been had?

Mr. McCCLURE. You will find it set forth.

Mr. MANN. I do not find it set forth. It says: "Done in the hall of sessions of the national legislative assembly of the State." I don't know whether that is a ratification or not. That is what I ask you.

Mr. McCCLURE. And then this is certified by the President.

Mr. MANN. I don't see where. It says: "Be it executed."

Mr. McCCLURE. That is their form.

Mr. MANN. That is what we are drawing out.

Mr. McCCLURE. Yes, this is a little foreign to me, as it is to you. Let me explain. This was a proposed contract submitted—

Mr. MANN. The reason I ask is because it is stated here that you have a concession from the President of the Republic of Nicaragua, and that has to be submitted to Congress, and that that has not yet been done.

Mr. McCCLURE. That was done.

Mr. MANN. The question is, whether that has been done.

Mr. McCCLURE. If I may explain—the President proposed a contract

which he submitted to Congress. He called a special session of Congress in a message which you will find set out in these Senate papers. He calls attention to the fact that, having considered the question and being advised as to the termination of the previous sessions, he calls the Congress specially for the purpose of having them take action on this very important session, which he somewhat enlarges upon in his letter to Congress. Then Congress passed it, as appears here, and he approved it under the words "Be it executed," which I suppose are words tantamount to whatever words the President of the United States—

Mr. STEWART. Have you a cession from Costa Rica?

Mr. MCCLURE. No, sir.

Mr. STEWART. How do you propose, then, to build it—

Mr. MCCLURE. That will be obtained without any trouble. The concession of Costa Rica is a matter of less moment than the concession of Nicaragua.

Mr. STEWART. You know the Costa Rican Government and the Nicaraguan Government are at crossed points and will not deal together?

Mr. MCCLURE. I know they are at crossed points on the question of confederation, but Costa Rica has maintained its identity—

Mr. STEWART. Why didn't you get your concession from Costa Rica?

Mr. MCCLURE. We will.

Mr. STEWART. Is it not necessary to get concessions from Costa Rica?

Mr. MCCLURE. Yes—

Mr. BENNETT. You don't make that statement positively, that it is necessary—

Mr. MCCLURE. I will tell you what I do say—that the only question in regard to the Costa Rican Government is the matter of overflow.

Mr. STEWART. Then you do not come here with a matured plan?

Mr. MCCLURE. We do.

Mr. STEWART. But you are unprepared to make any statement as to what you can or have obtained from Costa Rica?

Mr. MCCLURE. We have not purchased our derricks yet, for that matter; but that is a matter we will do.

Mr. STEWART. You spoke of a lease awhile ago—the effect of a lease—by way of analogy. You have not any right of entry; you have not any lease, or anything of that kind from Costa Rica?

Mr. MCCLURE. Nothing from Costa Rica; but that is only an incident. The great question is the right to build this canal through Nicaragua; and we will arrange with Costa Rica without any difficulty in so far as we encroach on Costa Rica's rights in the premises.

Mr. DAVIS. You say that the only arrangement necessary to be made with Costa Rica is in regard to the overflow?

Mr. MCCLURE. That is it. It will be necessary to build dams, the effect of which will be to make water flow over on Costa Rican soil.

Mr. DAVIS. No part of the canal will be constructed through the territory of Costa Rica?

Mr. MCCLURE. That is what I understand.

Mr. MANN. A part will be on the river; Costa Rica is on one side of the river?

Mr. BENNETT. Costa Rica does not approach closer than 3 miles of the river, I understand.

Mr. HINRICHSSEN. The San Juan River is the boundary.

Mr. DAVIS. I understand Nicaragua has concessions from Costa Rica, including the whole river.

Mr. McCURE. I am pretty sure that is set out in the report of the Senate committee, and I can only say that the complete surveys have not yet been made. It is true that the engineers have examined the country, but the complete surveys and the exact size and location of dams—those complete surveys not being finished, of course the exact building and exact direction has not yet been determined upon.

And now here we are following that properly, because the gentlemen I represent are not anxious for concessions to the extent that they would invade anyone's territory, feeling that this matter was open, as in any other business, for somebody to do it. It did not appear to them that the Republic of Nicaragua, having by communication of the Congress, having by communications to this company which became a matter of public knowledge, after being advised in an extraordinary way, declaring that they would not extend these sessions, having declared that it would end in October—these gentlemen felt justified in going ahead, and they do not feel that provision of the first concession would be invaded which says that further time would be given, and so forth.

Mr. HAWLEY. In what way do you interpret article 5 of the cession of Nicaragua to the Nicaraguan Company?

Mr. McCURE. I have been explaining that.

Mr. HAWLEY. Will you read it?

Mr. McCURE. It says, "The State binds itself not to make any subsequent concession for the opening of a canal."

Mr. HAWLEY. Does not that answer the statement you have just made?

Mr. McCURE. No; the Government of Nicaragua has not made a cession—did not make a cession during the term of the present cession.

Mr. STEWART. You said a moment ago this executed itself.

Mr. McCURE. After October, 1899.

Mr. STEWART. Then it has violated the provision of this concession, because it executes itself and cedes a certain right before the expiration—

Mr. McCURE. It says it shall not during the term of the present cession.

Mr. STEWART. Yes, sir.

Mr. McCURE. The present cession, as decided by the Government of Nicaragua, ends on the 19th of October, 1899.

Mr. STEWART. And do you have present rights?

Mr. McCURE. We have a present contract for the right, which will commence on the 19th of October, 1899, or sooner, if we so arrange with the Maritime Canal Company.

Mr. STEWART. Are not these rights?

Mr. McCURE. Yes, sir.

Mr. STEWART. In præsentî they have violated their contract?

Mr. McCURE. No, sir. They have not made a cession. Their stipulation was that they would not during the term of the cession make a subsequent cession. Now they have determined that that cession which exists expires—

Mr. MANN. Will expire, you mean.

Mr. McCURE. Will expire; that is the best language.

Mr. MANN. The only proper language.

Mr. McCURE. Will expire. I have said that several times. Will expire October, 1899. And they now say: We make a contract with you, Messrs. Eyre and Cragin, that upon the expiration, and not until then—they use those terms; not those words, but they use that expres-

sion—this contract which we now make, and which is all we have, which is all the Eyre-Cragin syndicate have, shall become operative, and not until then.

Mr. CORLISS. Isn't it true that the original concession of the Maritime Canal Company provided for an extension?

Mr. MCCLURE. If they should be proceeding and spending a lot of money.

Mr. CORLISS. May not the Nicaraguan Government between now and October 9 grant another extension, and thereby continue their—

Mr. MCCLURE. It can not do it under the terms of this cession.

Mr. CORLISS. Why?

Mr. MCCLURE. Because by this it is declared officially and formally that that cession will expire.

Mr. CORLISS. And you contend that that declaration was made in article 41?

Mr. MCCLURE. In article 41 or one of the articles of the present concession which I am reading.

Mr. MANN. Suppose that the Maritime Canal Company should expend \$50,000,000 between now and October 1 upon the construction of this canal?

Mr. HAWLEY. Please pardon me there. Suppose the Nicaragua Canal Company or the Maritime Canal Company should show the ability to expend \$50,000,000—

Mr. MANN. I am putting a strong case, because the right depends upon the extreme possibility. Suppose the Maritime Canal Company should expend \$50,000,000 between now and October 1 upon the construction of this canal, do you think that under their contract with the Nicaraguan Government that Government would be under the obligation or would have the right to extend the concessions?

Mr. MCCLURE. In answer to that—in the first place I can not imagine—

Mr. MANN. I am not asking you to imagine. I am doing the imagining. My imagination is vivid.

Mr. BENNETT. It must be; that is evident.

Mr. MCCLURE. As I am only an everyday, practical lawyer, mine is not. I could not imagine in the face of a provision like this. The Maritime Canal Company is at an end. I could not imagine that. I could not imagine the Government permitting that expenditure.

Mr. MANN. Do you think the Government could prevent that expenditure?

Mr. MCCLURE. I would not enter into that. But I answer your question now and say that even if the Maritime Canal Company did expend the money, and if the Government did admit it, it could not do it under this agreement it has made. It has by a formal act of Congress, ratified and approved by its President, said that it would not extend that concession. It has said in express terms, a legislative act approved by an Executive, that on the 19th day of October, or some day in October, 1899, that concession shall have reached its end.

Mr. MANN. Let me ask you another question—

Mr. MCCLURE. And it could not now revoke all of that, and say, "We did not do that, and we did make a contract with somebody else." If any government did do that it would be playing fast and loose, as the Government of the United States would not do.

Mr. MANN. Suppose you had made that contract nine years ago?

Mr. MCCLURE. The canal would be open now.

Mr. MANN. I notice you have Mr. Warner Miller as one of the members of your board, and he has not opened it yet.

Mr. McCLURE. Yes; Mr. Warner Miller is one of a number.

Mr. MANN. Suppose you had obtained that contract nine years ago, when there was a provision for the renewal of the concession provided the company proceeded diligently with the work; do you think that concession would have ended in case the Maritime Canal Company had gone ahead and expended large amounts of money; do you think that concession would end at the day fixed in October, whatever it is?

Mr. McCLURE. The suggestion is so remote I can hardly tell what I would say. If we had obtained and asked for a concession nine years ago the men I represent would not have stood idle. The men would not have entered into any—

Mr. MANN. You will admit that the termination of the contract does not depend upon what has been done, but upon what is possible to be done?

Mr. McCLURE. What is probable, I think is better. When you come down to the terms of the contract of course you take the letter of the contract, and the letter of this contract is very carefully written, because it specifically says what I have repeated over and over again.

Mr. HAWLEY. You stated clearly and explicitly and at the same time indicated that it was unnecessary to state a supposititious case, in which I agree, because the real case is before us.

Mr. McCLURE. Yes; we have troubles enough.

Mr. HAWLEY. If you are correct in stating that the Government of Nicaragua through its Congress and through its President, and through all its constituted authority, has entered into this agreement with your syndicate, with your company, to construct this canal, under the terms stipulated in that agreement, and that it could not, having bound itself as you say in good faith to do that, void or nullify that agreement, the question naturally recurs, doesn't it, to the inquiry whether they are not already in the same manner that you have just so specifically and clearly stated as being bound to your company, bound to the Maritime Canal Association, and have placed themselves in the same attitude, if you will, which you claim they are able to place themselves in with respect to your company?

Mr. McCLURE. I am very much obliged to you for asking me that question. It gives me a suggestion that I might have overlooked, because the concession to the Maritime Canal Association contemplates that, if they shall not proceed with the work in accordance with the concession and its provisions, it shall cease to exist. They were to expend certain moneys—

Mr. HAWLEY. Pardon me a moment. You are placing a construction of your own on the concession of Nicaragua and Costa Rica to this company—

Mr. McCLURE. I am answering the question.

Mr. HAWLEY. In doing so you are undertaking to make void the concession which has already been granted. That was not my question—as to whether that was void or not—but whether, if they were bound originally to the Maritime Canal Company, they were not bound now—now?

Mr. McCLURE. I am answering that by saying that they were not bound to the Nicaragua Canal Commission, for the reason that the concession made with the Nicaragua Canal Commission, taken as a whole—this provision is only one, Article 5—but as a whole it provides that

that cession shall die in case certain things are not done by the concessioners, doesn't it?

Mr. HAWLEY. I insist upon the proposition being stated with relation to the relations of the Government of Nicaragua to the Maritime Canal Company now.

Mr. MCCLURE. Therefore I am saying that the Nicaragua Government is relieved from that provision, that it will not grant any subsequent concessions during the term of the Nicaragua concession, because by operation of the terms of the Nicaragua concession it has ceased to exist by failure of the parties to comply.

Mr. HAWLEY. It has now ceased to exist?

Mr. MCCLURE. It will cease to exist on the 19th of October.

Mr. HAWLEY. Pardon me. I ask you to face this question now.

Mr. MCCLURE. I am ready to face it, if I understand it.

Mr. HAWLEY. Yes, sir; I have no doubt you are ready to face it. I don't mean to face it; I mean to answer it. I am only trying to reach a just conclusion.

Mr. MCCLURE. Of course I know that. I say, if the Government of Nicaragua has said that because this provision said they shall have ten years in which to do this work, and that that ten years will expire in October, 1899, and then at the end of those ten years this concession would fail—

Mr. HAWLEY. Right there—and I would not interrupt you, but I think it is appropriate at this place—will you kindly turn to article 48; will you kindly read that for your own information and for the information of the committee?

Mr. MCCLURE read from the article named as follows:

A term of ten years is also granted to the company for the construction, completion, and opening of the canal for maritime navigation. However, should events of main force arise, duly justified and sufficient to impede the regular progress of the works during the period of the said ten years, an extension shall be granted equal in duration to the time that may have been lost by such delays.

Mr. HAWLEY. It is particularly to the last clause that I ask your attention, the one you are now about to read.

Mr. MCCLURE (continuing):

If at the expiration of the ten years aforesaid the works should not be completed so as to have the maritime communication between the two oceans opened, in consideration of the great capital the company may have invested in the enterprise and of the good will and ability it may have shown and the difficulties encountered, the Republic binds itself to concede a new extension.

Mr. HAWLEY. Now, in answering the questions I have asked, I ask you to state in your own way, upon your own understanding and interpretation, if you will, if you desire, how the Maritime Canal Company can better express its ability and its good will if it showed beyond cavil or question that it had at hand the money to complete this canal?

Mr. MCCLURE. Shall show?

Mr. HAWLEY. Shall show before October.

Mr. MCCLURE. I think the Republic of Nicaragua had a right to adopt that idea of Patrick Henry, that you must judge something of the future by the past; and judging by the past nine years of inaction, so far as what was done is concerned, there is no prospect that within the few months remaining before the ten years shall expire that there should be put into that work not promises, not guaranties of something, but the work which would warrant the Nicaraguan Government in concluding, in the language of this section, "that there has been great capital expended."

Mr. ADAMSON. Mr. Hawley's question did not leave that matter open. His question was if they showed the ability to do it.

Mr. McCLURE. I say, then, that the Nicaraguan Government would be justified in saying: "Nine years having gone by without anything being accomplished, therefore it is a conclusion that it can not be completed to a fair extent before, by the terms of the concession, the concession expires."

The CHAIRMAN. Does having present possession of capital to expend at a future day mean precisely the same as having spent vast amounts of capital? Do you understand the two to mean the same?

Mr. McCLURE. I understand the question to mean that if the Maritime Canal Company was to say now: "We have or we are going to be in position to do this work, and go ahead with it," could the Government of Nicaragua sustain its present position? Am I right in that?

Mr. ADAMSON. That there is money set apart for the purpose—if they are able to say that and show it; if that is a fact.

Mr. McCLURE. I think the Government of Nicaragua is entitled to occupy the position of an ordinary contracting party and say, if the work has gone on, if there has been an evident intention to carry out the contract, then more time shall be given; but if there is an absence of any such showing, as there was in the case of this canal, then it seems to me a contracting party has a right to take the position that the Government of Nicaragua has taken. It seems to me the Government of Nicaragua was justified in concluding, as a contracting party would be in the same position in any business matter, that there has not existed up to the present time that evidence of good will—I do not know exactly what that means, but I know what ability means—that there has not been shown or has not existed up to the present time that good will and ability. I consider that to mean that if they had shown a continuous going along.

Mr. HAWLEY. It does not say so.

Mr. McCLURE. And if they had encountered difficulties, strikes, or perhaps a war between Nicaragua and some other country, perhaps a war with our country, that had prevented the sending of men down there, for instance; if that company had been standing there ready, and had said, "We are going on, and we have been prevented by difficulties which we could not foresee in finishing this work," then I say the Nicaraguan Government would be bound to give an extension.

Mr. DAVIS. Your idea is that inasmuch as the Nicaraguan Government will be the sole judge at last as to whether they will extend this charter or not, and there is no power to force that Government to do it, that now, when this time is almost up, they have a right to anticipate and make an arrangement for another contract?

Mr. HAWLEY. You have spoken of a contracting party having a right to cancel a contract. Do you interpret it that a party shall arbitrarily cancel his contract?

Mr. McCLURE. It is done every day.

Mr. HAWLEY. Without regard to the wishes of the other party?

Mr. McCLURE. Sometimes that is the only protection a man has in business life.

Mr. HAWLEY. That is hardly my question. I asked—

Mr. McCLURE. I say, yes. I presume the gentleman is a lawyer. If a client came to me and said that a contract he had made for the erection of a warehouse, for instance, had been standing and no work performed for nine years, that the company which was to construct it had been sold out and become insolvent, and everything about that work was deso-

lation, I would advise my client: "You must assume that the other party has broken the contract."

Mr. HAWLEY. And make a self-operative contract with some other party—self-executory?

Mr. McCLURE. Everybody does that. That is the way that contracts are enforced. Men say, "If you don't live up to your contract it is forfeited," and every day bonds are put up on large works to compel the performance, but there are provisions in almost every contract that is made for construction that if it is not finished by a certain time the contract is at an end.

Mr. BARHAM. And in that case isn't time the essence of the contract?

Mr. McCLURE. Sometimes.

Mr. BARHAM. But isn't that the rule? And otherwise you can not, ipso facto, forfeit the contract?

Mr. McCLURE. No, sir; not in cases of this kind. When no work is done for a great many years then you have the right to assume that the man does not intend to follow his contract.

Mr. BARHAM. I wanted to say this. I think, from what you say, that you claim that you have a concession in presenti to take effect next October?

Mr. McCLURE. We have a contract which will mature into a concession in October.

Mr. STEWART. Haven't they courts in Nicaragua?

Mr. McCLURE. Yes, sir.

Mr. STEWART. This is a legislative country?

Mr. McCLURE. Yes, sir.

Mr. STEWART. It says in article 8:

The Government shall bind itself and shall declare that no concession or privilege heretofore granted by it opposes, conflicts, embarrasses, or prejudices in any manner the concessions from it in this contract.

That is a legislative judicial construction, isn't it?

Mr. McCLURE. That is the word of the——.

Mr. STEWART. Why don't you go to the courts of Nicaragua and have a judicial construction?

Mr. McCLURE. Because we are not quarreling with the Maritime Canal Company.

Mr. STEWART. But you as a lawyer consider that as a proper construction of that?

Mr. McCLURE. I consider that where the government is one party the legislature must act for that government.

Mr. STEWART. Must they act judicially?

Mr. McCLURE. No. Legislatures do not always act judicially when they declare the terms of contracts.

Mr. DAVIS. Are you in a position to go to the courts?

Mr. McCLURE. We are not. I want to say that we make no contest over this. We simply find that without any action on our part the Government of Nicaragua itself has declared that it will not further recognize it.

Mr. DAVIS. Would you have any standing in the courts in Nicaragua until after the 19th of October?

Mr. McCLURE. No, sir; and not after the 19th of October, either, until somebody should try to prevent the operation of our own contract. We are not trying, I want the member and the committee to understand, to dislodge anybody. I want that thoroughly understood; that the gentlemen I represent are not that kind of men, and not seeking that position.

Mr. ADAMSON. But this other company is interested in that. Whether it will have to dislodge somebody or whether you will dislodge them.

Mr. MCCLURE. We stand by the contract with the Government of Nicaragua, and assume they will perform its contract with us. After we found the Government of Nicaragua had itself declared that its concession previously issued was at an end, and that the matter was free to the world, and it did not seem that the canal was going to be built, the company I represent then said, commencing where the other one ended, or sooner, that they would take a concession.

Now, these gentlemen entered into this to build a canal, and they did not enter into it to negotiate with anybody, but to build the canal themselves, and they went ahead as they have done; but this has become a great public question and subject, and there is a manifest disposition, and I can not say it is not a very proper one; the Government of the United States is intensely interested in this matter. While both of these concessions, both the concession to the Maritime Canal Company and the concession to us, specify that they shall not be transferred to any government, and we can not transfer ours, and do not want to, yet we are willing, and I have come here to say, that this syndicate will meet the wishes of Congress with reference to any government control that it sees fit to put into it. It does not intend to, their members are too high spirited and too public spirited for that, and it does not intend to force any contract with Nicaragua in opposition to the wishes of the people of the United States or its Government, and they do not care enough about it for that. If the men whose names are on that paper can not carry this on with the sanction and approval of the Government, it would be unwise for them to carry it on at all.

We expect to have the Government of the United States stand behind us as being citizens seeking the development of our country, and it is understood at our expense, and we do not ignore, and we invite, and we come here gladly upon the suggestions that have been made. I did not ask to be heard, but we appreciate very much the opportunity given us to be heard. We think the Congress ought to know everything that anybody knows about this subject, and any Government control you want to put upon this, put it, and it will meet with a welcome from the gentlemen of this syndicate. What that will be I do not know. Evidently there is in contemplation that the President of the United States shall be through Congress given the power there. We have no objection to that.

The main object of my coming was first to impress upon you that we seek to dislodge nobody. We enter into a field that seemed to be open to honorable business men, willing to pay their own money, willing to carry out a great work, of great risk, and we invite that action of Congress and the President which will allow the President to say to us, "If you are the only people in the field who have a contract with the Government of Nicaragua, the Government of the United States wants that to be disposed of in a certain way." On the other hand, if the President of the United States, authorized and clothed with the power which it is proposed to give to him, and properly, looks over the field and says the Government of the United States can not stand against the Government of Nicaragua as to what that Government shall do or what it shall not do on its own territory, and if the President further says, "In looking over this field we find that the Government of Nicaragua, whether properly or improperly, has decided that it will not recognize any other contract than this one, and that that is the one it will amicably and agreeably recognize as performed,

it is a function of the Government to take hold of that, and it can take hold of it as it pleases," then that is very well.

This syndicate will meet the Government on this proposition just as the Government wishes to have it meet it, and I wanted to assure the gentlemen of that fact, and we stand here, therefore, not combating any canal or project, but simply saying we represent a contract which we have thought we were right in entering into, or we would not have done it. The other party declared that they had a right to make it, and there it is, and if you want to put upon that some power of the Government to say what the tariff shall be, what kind of a canal it shall be in construction; if you want your engineers to say that the locks shall be 700 feet long, and be able to take the biggest ships rather than be only 550 feet long, very well, or if the Government says "You must have certain tariffs which will have certain effects," say it, and have a representation in the board.

Mr. BABHAM. But not a controlling representation?

Mr. MCCLURE. No, sir; certainly not. The other concession did not provide for that. Of course, I notice that the bill before Congress does provide for the actual acquisition by the Government of the whole thing. It is in utter opposition to the terms of that concession, because it says under no circumstances shall it be transferred to any foreign government, and another intermediate section says it shall not in any part or in any form be transferred to any government.

Mr. HAWLEY. Of the territory, you mean?

Mr. MCCLURE. The cession.

Mr. BABHAM. But that would not affect the transfer of the stock, would it?

Mr. MCCLURE. I think so.

Mr. BABHAM. As a lawyer, do you think that? Do you think the transfer of all the stock would affect the title to the cessions?

Mr. MCCLURE. The transfer of all the stock would give the ownership of that stock to the man who held it.

Mr. DAVIS. As the owner of the stock, don't you think it gives you the ownership of the property?

Mr. MCCLURE. It has been held that when a man holds all the stock and makes a contract he binds the corporation. And that is only accomplishing a thing in what may be called an indirect way.

Mr. MANN. If those things go as you expect, and in the fullness of time your contract goes into effect, then do these gentlemen propose to put up the necessary money?

Mr. MCCLURE. They have never suggested anything else. They never have suggested anything else but putting up the necessary money, and in a letter the president of the executive committee wrote the President they proposed to expend \$20,000,000.

Mr. MANN. That is simply an opinion. What we want are facts. You are here to give information, and that is a piece of information we would like to have.

Mr. MCCLURE. This contemplates that within three years we shall have communication between the oceans or we lose our contract.

Mr. MANN. By railroad?

Mr. MCCLURE. By railroad and boats. That would be a preliminary. We propose to do this work, and we have entered into a contract, not that in ten years we will ask for more time, for in three years we shall have communication right through for heavy freights, and in ten years we will have it all open for water transportation.

Mr. MANN. It appears this company had two tasks before it. One

was the Herculean task of raising the money. We would like to hear of a company that had the means.

Mr. McCLURE. You have struck it this time. I want to say that the best argument is the good faith of those men.

Mr. MANN. The responsibility of a man and the responsibility of a corporation he may take stock in are different things.

Mr. McCLURE. But he does not put in his money with the expectation of losing it.

The CHAIRMAN. Will you explain the connection between the concessioners named and the list of the men you read?

Mr. McCLURE. Yes. They are the owners of that concession. They would not amount to anything otherwise—

The CHAIRMAN. Are they mentioned?

Mr. McCLURE. The concession is transferred to them.

Mr. STEWART. Has anything been paid?

Mr. McCLURE. One hundred thousand dollars, promptly, and they have agreed to pay \$400,000 more within six months after October, 1899, which they propose to do. They propose to give Nicaragua an advantage in the contract. While they give them this contract in perpetuity they give them 8 per cent of stock, and then a larger share of the profits.

Mr. MANN. Do you think this is of greater value by far than the concession to the Maritime Canal Company?

Mr. McCLURE. Yes, for this reason: In the first place, it is in perpetuity. In the next place, it gives us the right to control 5 miles on each side—police it.

Mr. MANN. Therefore you think it would be much easier to raise money on this concession—

Mr. McCLURE. Yes, sir.

Mr. MANN (continuing). Than it has been on the other?

Mr. McCLURE. Yes, sir; because there were too many clauses in the other one that might determine it.

Mr. MANN. Under this cession, as I have glanced over it, there is no termination of it?

Mr. McCLURE. No, sir; unless we fail to comply with our contract.

Mr. MANN. They fine you, that is all. They fine you \$100,000 a year if at the end of ten years you have not completed the work. Is there any provision in it anywhere for ending the concession?

Mr. McCLURE. Ending the concession itself?

Mr. MANN. Yes.

Mr. McCLURE. Listen to this—article 38:

This contract shall be annulled only for any of the following causes, duly-proven, always excepting cases of force majeure:

First. If the company shall not be legally organized within the time specified in Article II.

Second. For failure to make the deposits in the general treasury of Nicaragua which the company may be obliged to make by this contract.

Third. For any transfer which the company may make of this contract to any government without the previous consent of the Government of Nicaragua or of the government of the republic of which Nicaragua may form part.

Fourth. For noncompletion of the line of transportation from ocean to ocean, by means of railway and boats, within six years from the date of the organization of the company.

Fifth. For abandonment of the works of the canal during a period of three consecutive years.

Sixth. For non-delivery to the Government of the stock to which it shall be entitled in the place, time, and form set forth in Article XXX of this contract.

Mr. MANN. But there is no provision in there for ending the cession or not completing the canal?

Mr. McCLURE. No, except the fine.

The CHAIRMAN (reading from the article). "Within six years from the date of the organization."

Mr. McCLURE. That is, railroad and boats. You must understand we can not do that six years' work without doing the greater part of the work of the canal, for this reason: We can not carry those cars in the water as at present; we have to deepen the stream.

Mr. MANN. There is no provision in this contract—

Mr. McCLURE. Oh, yes. This provides that we shall carry the railroad cars. We can not do that without deeper water.

Mr. MANN. You could do it on the waters already existing there.

Mr. McCLURE. No, sir; we can not.

Mr. MANN (continuing). As they are doing it on the lakes.

Mr. McCLURE. You haven't the depth of water there they have on the lakes.

Mr. MANN. The barges on the lakes do not have any draft of water at all. They have regular railroad transportation on the lakes now, going out of Chicago all the time, and they do not draw any water.

Mr. McCLURE. I am willing to answer any other questions.

Mr. DAVIS. I should like to ask a question which was suggested by one of the questions of Mr. Hawley. It is in regard to Costa Rica's rights. Mr. Hawley suggested this very question of concessions claimed to have been made by Costa Rica to Nicaragua, which was the question submitted to Mr. Cleveland as an arbitrator, and that Mr. Cleveland held with Costa Rica's contention, and that the rights of Costa Rica now come up to the river. How about that?

Mr. BENNETT. I do not think that is a fair question, and as a member of the committee I object to the witness answering it unless he wishes to.

Mr. DAVIS. He can do it or not, just as he pleases.

Mr. McCLURE. I will say this—

Mr. DAVIS. If it is not to his interest to answer it he need not do it.

Mr. McCLURE. I would frankly answer you as to whether it is—

Mr. MANN. The objection is that he should not be permitted to answer it.

Mr. BENNETT. I said that I objected to his answering it unless he wanted to.

Mr. DAVIS. If he wishes to answer it he can.

Mr. McCLURE. I choose to answer it. I have not anything that I am not willing to tell. I am informed—there was no necessity that I should have investigated that question—but I am informed that with reference to the question of Costa Rica there was no difficulty—there would be no difficulty and no trouble. What that is I do not know; what negotiations have been made I do not know.

Mr. DAVIS. I can get all the information about that I want. I was simply asking you the question with a view of testing your recollection of it.

Mr. McCLURE. I thought the question was what the present arrangements were, or was it a question as to what Mr. Cleveland had done?

Mr. DAVIS. Simply this: You have concessions only from Nicaragua?

Mr. McCLURE. That is right.

Mr. DAVIS. I understood you to say that from the view your company takes of the matter there is no necessity of getting concessions from Costa Rica, except as regards the question of backwater.

Mr. McCLURE. I said mainly that, the streams being in Nicaraguan

property, naturally there would be very little to get from Costa Rica except the right to back up the waters of the lake.

Mr. DAVIS. All I asked you was whether or not there was any arbitration, or had been any arbitration, in this matter by which it had been determined that Costa Rica's territory actually comes up to the river, and that she has riparian rights there.

Mr. McCCLURE. All I know is that in the Senate Committee reports there is some reference to that, or in some of the papers that are attached as documents there. There is some contention as to the lines of those two Republics, and, as I remember it, the committee referred to some action of President Cleveland upon it, which, as I understand it, brought the right of Costa Rica to the edge of the river.

Mr. HAWLEY. You have just stated to Mr. Davis that you are informed that Costa Rica will be all right, that there will be no difficulty—

Mr. McCCLURE. I am told—

Mr. HAWLEY. By your associates?

Mr. McCCLURE. My clients. That as far as Costa Rica is concerned there will be no difficulty. I have not been given any information as to what that means.

Mr. HAWLEY. Will you kindly tell us whether you mean by that that Costa Rica has been negotiated with and that they have assented to confer these rights, or that Costa Rica is not to be considered; that she is to be ignored. Which interpretation shall we put upon what you mean?

Mr. McCCLURE. You need not put either. Costa Rica is not to be ignored, and I do not understand it that Costa Rica has agreed to anything, because if it had it would be in the form of documents, which I should present. But I understand the syndicate does not contemplate that there will be any trouble in arranging the matter, because it is as much to the interest of Costa Rica as it is to the interest of Nicaragua.

Mr. HAWLEY. It is simply tentative, then?

Mr. McCCLURE. Yes, sir.

Mr. BARHAM. You understand that Costa Rica has rights there which must be conceded before the canal can be completed?

Mr. McCCLURE. I have not investigated the laws, but I should take it that Costa Rica should be considered. It is a country we encroach upon.

Mr. BARHAM. Then you would not have the right to construct the canal without the consent of Costa Rica?

Mr. McCCLURE. I understand so. Nicaragua has given us rights which she has assumed to possess. I have not investigated and I can not say.

Mr. HAWLEY. You can not say, then, that your clients are fully prepared to construct this canal?

Mr. McCCLURE. I do say so, when they shall be permitted to. They will not have the right to do so until after October.

Mr. HAWLEY. But they will have the right, you say, without Costa Rica granting concessions; you say that your clients will have the right to go ahead and construct the canal independent of what Costa Rica may grant?

Mr. McCCLURE. I will not say about that.

Mr. HAWLEY. You won't say your clients are prepared now to construct the canal?

Mr. McCCLURE. They are.

Mr. HAWLEY. And still you say Costa Rica has made no concession so far as you know?

Mr. McCLURE. I do not know of any, and I do not know what the requirements of the law of Costa Rica are.

Mr. HAWLEY. You appreciate the fact that it is somewhat confusing for you to say that your position with regard to Costa Rica is tentative, and still to say that you are prepared to go forward?

Mr. McCLURE. I say so far as my information goes; for aught I know Costa Rica may have provided for an agreement.

Mr. HAWLEY. I understand that, but as far as you know, with all your answers before us, it is not competent for you to say you know that your clients or associates are prepared to go forward with the construction of this canal after October 1, 1899.

Mr. McCLURE. I am instructed by them to say that they are prepared to enter upon the purpose of this contract when it shall be in their power to commence—October, 1899. What it is necessary for them to do with Costa Rica I do not know.

Mr. HAWLEY. You state, then, what you do state by authority of your clients?

Mr. McCLURE. Yes, sir. I was never in Costa Rica or Nicaragua. A lot of these things I take as information given to me, but most of the things I take from the records.

Mr. BARHAM. You know of all the records?

Mr. McCLURE. Yes, sir.

Mr. BARHAM. The records of your company?

Mr. McCLURE. I mean the records before Congress. I am not a member of the company.

Mr. BARHAM. You represent the company?

Mr. McCLURE. I am simply an attorney, and do what they ask me to do, and one of the things was to come here.

Mr. BARHAM. You are the general attorney of the company?

Mr. McCLURE. Yes, sir; I think so.

Mr. BARHAM. Don't you know what the record of the company is, and its concessions?

Mr. McCLURE. I do not know about that. As I have said, I do not know of any concessions from Costa Rica.

Mr. BARHAM. And you do not know of any claims the company makes of any concessions?

Mr. McCLURE. No, sir; I do not know of any claim the company makes of any concessions from Costa Rica.

I am very much obliged to the committee for its attention.

STATEMENT OF MR. EDWARD F. CRAGIN.

Mr. CRAGIN said:

Mr. Chairman and gentlemen of the committee, I will take a moment to speak of this subject in connection with Nicaragua's position. You seem to have misunderstood the position as far as Nicaragua is concerned. Nicaragua holds that the Maritime concession had become null and void. I speak by authority. I have the written authority to speak for President Zelaya, of Nicaragua, who requested us to present his position properly before the American people.

After consulting with the members of the supreme court of Nicaragua, to which allusion was made this morning, and other leading attorneys (there having been six members in the consultation and five of them

delaring one way and one the other way), that Government held with the five that the Maritime concession had become null and void for non-user and other reasons. The other member was in doubt. He did not hold that the Maritime concession was good, nor did he feel like saying it was entirely null and void. The President stated in his message to the Nicaraguan Congress, which was called to consider this new concession—the Eyre-Cragin—that the Government of Nicaragua had the clear and well-defined opinion that the Maritime concession had become null and void owing to the lack of fulfillment of its most essential clauses and the abandonment of the work for nine consecutive years; but being desirous to avoid troublesome discussions which might give rise to difficulties, owing to the rancorous feelings which are likely to arise when one's interest is at stake, it made the date of the new Cragin-Eyre contract become effective October 10, 1899. You have the exact words in the copy of the message of the President of Nicaragua included in my remarks.

The position in Nicaragua is one that it seems to be difficult to be appreciated here; but they look on it somewhat as follows: Suppose this Congress should pass laws in relation to the Hudson River, and within sixty or ninety days thereafter Germany or France or Nicaragua should pass laws in relation to the Hudson River. You would be surprised and feel hurt. The Associated Press correspondent at Managua, the capital of Nicaragua, yesterday morning telegraphed that there is a very sore feeling in Nicaragua over the fact that the American Congress is considering seriously a bill which utterly ignores the action of the Nicaraguan Congress. I have a letter in my pocket, written about the middle of December, from a prominent man in Nicaragua, stating the same thing.

This canal is the great object of interest and attention of Nicaragua. It is only one of many to you. It is everything to them. They want the canal constructed. They have been misrepresented. They have been misrepresented in many ways before the American people. They examined this thing with care. They consulted their best authorities, and they were very clear that what they did was the right thing to do. They will expect the United States to recognize their position in the matter.

(After discussion, the committee decided to continue the hearings on the Nicaragua Canal on Friday, January 20, 1899, whereupon the committee adjourned.)

JANUARY 20, 1899.

STATEMENT OF MR. EDWARD F. CRAGIN.

Mr. CRAGIN said:

Mr. Chairman and gentlemen of the committee; the new concession is not the result of the increased interest in the canal occasioned by the war with Spain, but is the outcome of the expenditure of much time and money through a period of several years. In 1894 I had an understanding with the management of the old canal company, and proceeding upon that understanding secured the cooperation of men of national reputation and financial strength with a view of constructing the canal. A number of these were Chicago men. But the promises made by the canal company were not fulfilled and the matter was dropped for the time being.

In the fall of 1897 a contract was entered into with the Canal Company, under which there was taken to Nicaragua in January of this year, at the expense of my associates and myself, a large group of contractors and engineers, who, if the conditions were favorable, were to make bids for the construction of the canal.

It developed in Nicaragua that the concession known as the Maritime Canal Company's was so defective as to require most extensive and radical changes before actual work could be let to contractors. It was also evident that the present management of the Maritime Company was not in good standing in Nicaragua.

Upon the party's return to this country the Canal Company, having changed its officers, refused to carry out its contract.

This, then, was the situation last spring; the Canal Company had failed to carry out its contract; the concession granted April, 1887, to complete the canal by October 9, 1899, expired by limitation on that day; there was no money in the company's treasury, and it had no credit; there was no possibility of getting a renewal of the concession unless there came a radical change in the officers, and there was no apparent effort being made for such a renewal. There were very large issues of stocks and bonds of the Maritime Canal Company and practically no assets; the property was wasted, and there was discord in the management itself. There was but one thing to do, namely, organize a strong American syndicate on new lines and secure a workable concession that would enable a new company to construct the canal. This was done. Men of large capital and high standing in the commercial world joined the movement with the object of securing to Americans a new concession. A new concession was prepared having special reference to the views and needs of the Government and the people of the United States.

Mr. E. Eyre, Mr. Frank S. Washburn, Mr. E. A. Hackett, and myself proceeded to Nicaragua to secure the concession. We were received most cordially by the Government. A dispatch which we sent to President Zelaya, stating that we were on the way, was given by him to the daily papers of Managua, and a special train was sent to Corinto for us. The situation in Nicaragua is different from what has been generally understood in the United States, and we beg to submit a statement of that country's position, signed by Mr. Washburn and myself, as follows:

Adverse criticism of the course pursued by the Nicaraguan Government in granting a new contract for the construction of an interoceanic canal and erroneous statements of its attitude toward canal matters generally have been so common in the public press of this country that it is but just to the Nicaraguans that these false impressions should be removed. At the request of President Zelaya, of Nicaragua, the undersigned beg to present the situation from the Nicaraguan standpoint.

The people of Nicaragua are far more deeply interested in the present construction of the canal than are the citizens of the United States. They view it as the one political and commercial necessity, not only for Nicaragua, but for all the Central American Republics. The Government and the people have endeavored always to pursue a course which promised the earliest possible consummation of their one great work.

To this end they have not only acceded to what they considered the unreasonable demands and wishes of the old concessionaire, but through the nine years of inactivity on the part of the Maritime Canal Company have thoroughly safeguarded their right to give another concession when the old one should become void or should expire without the completion of the canal. It is but natural, therefore, that the Nicaraguans should feel deeply the unwarranted charge that their country had delayed the work. Their whole thought and effort have been to help on the work, and they declare the charge to be wholly false and unfounded.

ATLAS CONCESSION EXPLAINED.

It has been said on the floor of Congress and repeated through the press of this country that Nicaragua was unwise enough and sufficiently careless of the interests of the canal to grant to the Atlas Steamship Company, of Liverpool, a concession that is or could be made an impediment to the construction of the canal. Such a statement is absolutely unfounded, and is due undoubtedly to an erroneous and incomplete translation of the Atlas concession on file in the State Department at Washington. The vital difference between the correct and incorrect translation of the concession will be readily seen from the following:

Correct translation:

"ARTICLE XIX. This concession shall never be an obstacle to the carrying out of any contracts the Government may decide to make in regard to the opening of an interoceanic canal over the same route, nor shall it affect in the least those it may have entered into.

"ARTICLE XX. It is understood that during the term of this agreement the Government can not subsidize any other company of steamers in Lake Nicaragua.

"ARTICLE XXII. In case of expropriation owing to the opening of the interoceanic canal, and considering the expenses the company may have incurred, it shall be indemnified by whom it may concern for the value of the materials of the enterprise, according to such title as the company may be able to show, it being understood that the Government of Nicaragua shall not pay in any case any indemnity whatever."

Translation in State Department:

"ARTICLE XIX. This concession will not be an obstacle in the way of the contracts which the Government has relative to the opening of the interoceanic canal along the same line, nor will it affect the contract for the same, which has been made.

"ARTICLE XX. It is understood that the Government cannot during the term of this agreement give a concession to any other steamship company which may be established in Lake Nicaragua."

Article XXI is omitted entirely, as well as Articles XXII, XXIII, and XXIV.

There has been placed in the hands of the Secretary of State at Washington a certified copy of the Atlas concession in Spanish, properly attested by the minister of public works and subsecretary of state of Nicaragua, from which above correct translation was made. President Zelaya particularly desires that attention be called to the misrepresentation so broadly circulated in regard to this concession.

STATUS OF MARITIME COMPANY.

Another serious misconception in the United States of Nicaragua's attitude has to do with the status of the Maritime Canal Company's contract. Nicaragua alleges that since the concession became operative no construction work whatever has been done. An impression to the contrary seems to prevail here.

The facts as presented by the Government officials are as follows: In April, 1887, a contract to construct the canal, known as the Cardenas-Menocal concession, was executed and transferred to the Maritime Canal Company of Nicaragua. This concession was not to become operative until \$2,000,000 should have been expended in the work. By the purchase of dredges used on the Panama Canal work, the construction of 11 miles of railway, the erection of light frame buildings, a pier, the partial excavation of 1,500 to 2,000 yards of canal 17 feet deep, and some dredging in the harbor, the Maritime Company secured an admission from the Nicaraguan Government that the requirements for the preliminary conditional expenditures had been complied with.

The Nicaraguans understood that the expenditure of this sum was to be made within the first two years of the ten-year period originally granted, within which period the canal was to be completed. The company claimed that the ten-year period should date from the day upon which the \$2,000,000 had been expended, and, while this contention does not appear as sustained by the wording of the contract, the Government acceded to the company's views and it was agreed that the concession to build the canal would be operative for ten years from October 9, 1889, two and a half years subsequent to the date of the original signing of the contract.

The people and the Government felt that the canal was now assured to them, and that with the great length of time placed at the disposal of the company the opening of the canal for universal commerce during this century was assured. They waited for the work of construction to begin. Their chagrin and disappointment may be imagined as the weeks and months rolled into years without the turning of a wheel upon the work and the employment of labor.

The dredges have for years been wrecks, resting on the bottom of Greytown Lagoon; the railway is rotted out and overgrown; the buildings are mere shells, standing upon rotted timbers, and the harbor is filled with sand and the entrance from the sea is never at the most over three feet in depth. Such of the property as has not

been destroyed has been realized upon. Much of the company's property has been sold under judgments. Piers, buildings, telegraph and telephone lines, steamboats, and dredges are gone. The remnant of railway that remains reverts to Nicaragua next October.

We were told that the last sale of the company's assets was of hand tools, surveying instruments, etc., sold to the Nicaraguan Government for a few thousand dollars, part of which was paid to the company. The company's representative is now pushing the Government for the balance, in order to pay his salary and that of the watchman. To Nicaraguans, at least, the attitude of the company, claiming ability to carry out an enterprise involving \$100,000,000, pressing a claim of a few thousand dollars against a Government which is the company's creditor, is ridiculous.

A claim on the part of the Maritime Canal Company to an extension of its concession beyond October 9, 1899, would be treated by the Government of Nicaragua as the merest effrontery. Nicaraguans refuse to credit the rumor that the company claims the right to an extension. The pretension seems so preposterous, so wholly without justification under the terms of the contract, or on a basis of equity, that it does not receive serious consideration.

STATUS OF LATEST CONCESSION.

The Government of Nicaragua has now, within the strict limits of its rights and actuated solely in the interests of the Republic, granted to those who represent ability, experience, and capital a contract to construct, operate, and own the inter-oceanic canal, and to attain that object the Government has not hesitated in granting to the new concessionaires the most liberal terms.

And it has done so because it wants the canal built by a private corporation, in proof of which Nicaragua has granted to those representing an American syndicate a concession in perpetuity, absolute liberty of action within Nicaraguan territory, that could not be granted to a foreign government, no matter how friendly, and complete exemption from taxation of any kind forever.

This is Nicaragua's attitude.

EDWARD F. GRAGIN.
FRANK S. WASHBURN.

I beg also to request that in the reports of this hearing there be printed a correct copy of the Atlas concession granted by the Nicaraguan Republic. The erroneous and incomplete translation of this has been on file in the State Department in Washington, and was printed in the Senate Report of December 7, 1898, a correct copy of which will be appended at the end of my remarks.

After one or two conferences with President Zelaya, the Government of Nicaragua appointed a commissioner, and the contract was carefully discussed. I think the time required, working as we did every day and often evenings, was thirty days. It was written in English and translated into Spanish; then translated into English, and corrected again and again. Upon its completion, and upon its being signed by the commissioner and ratified by the President, the Congress of Nicaragua was duly called and the President's message relating to this concession was read to them. The correct copy of this message will be appended to my remarks.

Congress occupied four days and nights in discussing this contract. There was some opposition, but it was finally passed unanimously. A group of the members of Congress of Nicaragua were opposed to granting any land until the canal was completed. In the contract, as agreed upon by the commissioner and ourselves, we were entitled, as was the case in the maritime concession, and as is generally the case, to receive lands donated in proportion as the work progressed. The group of Nicaraguan congressmen thought that this might throw clouds on the title, and urged that no land be granted until completion of the canal. After our yielding this point, all opposition vanished and the bill was passed unanimously.

You will notice that we were not obliged to build in Nicaragua a Tipitapa Canal, nor to spend a definite amount of money within a given

time, as was the case with the maritime concession. We paid into the treasury of Nicaragua \$100,000, \$15,000 in drafts on London and \$85,000 in drafts on New York. These drafts were made at the request of the Nicaraguan treasury department, as the Government had payments to make in the two cities. May I call your attention to some striking things in this concession? This concession is in perpetuity, instead of being for ninety-nine years, as the previous ones have been. In Article 8, page 4, the Government binds itself and declares that no concession or privileges heretofore granted by it opposes, conflicts, embarrasses, or prejudices in any manner the concession promised in this contract. This guaranties us against the Atlas, Maritime Canal concessions, and all others. Article 10 gives us any land and any water anywhere in the Republic for our use. Article 13 is very sweeping. You gentlemen who have had experience in such matters will understand that in South and Central America such complete control of any enterprise by foreigners is rarely obtained.

There are no taxes or customs duties for all time on canal property. During the construction of the canal everything relating to the canal and its employees and contractors and their dependents are free from taxes and duties. The police and sanitary powers are extremely strong. They give the company absolute control of the canal and land for 5 miles on each side thereof. Undesirable men and women can be prevented from coming in this zone, and practically every building and boat can be under the control of the company's police. The nineteenth article on neutrality is very strong. The Panama concession provides that neither troops nor munitions of war can pass without permission of the Colombian Government. There are no half rates for tolls to Nicaraguan and Central American vessels, but Nicaraguan and Costa Rican vessels pay the same rates as do the vessels of the United States.

Mr. STEWART. You said you paid in \$100,000, and that \$85,000 of that was drafts on London.

Mr. CRAGIN. \$15,000 was drafts on London and \$85,000 on New York.

Mr. STEWART. Don't you propose to raise a large amount of your money in London?

Mr. CRAGIN. No. I would rather not talk about the syndicate at this moment, as I have only a few minutes of my time remaining. I represent Cragin and Eyre, the concessionaires of this concession or contract, and I would like to talk about it during the time at my disposal.

Mr. BARHAM. I would like to ask the gentleman a question, because he seems to be thoroughly posted. Did you say you had sufficient capital at your disposal?

Mr. CRAGIN. I have not said so. I ask to be excused, in the short time I have, from talking about the syndicate.

Mr. BARHAM. I hope the gentleman will be given sufficient time to explain to the committee how this capital has been secured, from whom, and time to show us fully the ability of the company to furnish the necessary money to build the canal. There is simply a statement that there is a lot of capital. I want to know how this syndicate was formed, where the money is coming from, and whether they really have the money to go ahead.

Mr. CRAGIN. You had a gentleman here Wednesday who stated that he represented the syndicate. He talked for an hour and thirty minutes. I would rather take the time you have allotted to me to talk about the concession, as that is my special mission in appearing before you.

Mr. ADAMSON. You had better talk on the subjects we ask you about.

Mr. BARHAM. I hope the gentleman's time will be extended long enough to answer my questions.

Mr. CRAGIN. Upon returning to this country we were very much surprised to find that our position had been very much misrepresented and that there was opposition to our movement. We expected the thanks of the Government and the public, but in many cases found the contrary. May I call the attention of committee to the fact that this claim of the right of extension of their concession by the Maritime Company is, we think, practically new. As I remember, in all the meetings of the stockholders and in the discussions on this subject in this building the statement has constantly been made that unless something is done by October 9, 1899, the Maritime Company's rights will be lost and the property will revert to Nicaragua, and the English or Germans, or some other foreigners, will come in to complicate matters. I repeat that I think this claim of the right of extension is practically new. It is claimed by Nicaraguans that such a thing had never been heard of.

There has never been a letter or communication conveying this idea. On the contrary, it is claimed in Nicaragua that the correspondence with the Government of the United States gives the clear impression that after October, 1899, the United States Government will make no comments on any action of the Nicaraguan Government. And now Nicaragua has, after full deliberation, formally declared, by unanimous vote of its Congress, that the maritime concession expires October 9, 1899, and has granted and guaranteed another exclusive concession. In the face of this, that Government will and must refuse to negotiate for an extension.

Gentlemen of the committee, we have saved the situation to Americans and we have secured a most sweeping and clearly defined contract, as nearly perfect as you can make it. This was done with no protest or remonstrance whatever from the Government of the United States to us or to the Government of Nicaragua.

Upon our return, and as far as I may judge from the press, the feeling in the United States seems to indicate a preference that the canal be constructed by the United States; that is the attitude quite generally taken, but when carefully considered, serious objections will be encountered. Time will not permit discussion of all this at the present time, but the best plan for the American people and for the Government of the United States, in my judgment, is to construct the canal and operate it on lines similar to that along which the Suez Canal was constructed and is operated.

This is most satisfactory to Great Britain, which owns the controlling interest in the Suez Canal Company. It is satisfactory to everyone.

This Eyre-Cragin concession, if properly understood and utilized, will secure the prompt construction of the Nicaragua Canal on lines satisfactory to the American Government and people and with the hearty cooperation of Nicaragua.

I thank you, gentlemen, for your attention.

Mr. BARHAM. Now, I would like to ask you the question.

Mr. CRAGIN. Senator Warner Miller is here—it is his time, not mine—and I will not speak until after Senator Miller has spoken.

MESSAGE OF PRESIDENT ZELAYA, PRESIDENT OF NICARAGUA.

GENTLEMEN DEPUTIES: I have summoned you to meet in extra session for the purpose of considering matters of vital importance connected with the general interests of our country.

In the first place, a report will be laid before you of a promise of a contract for the construction of an international canal through our isthmus with Messrs. Edward F. Cragin and Edward Eyre, representing a reputable syndicate of North American capitalists.

The clear and well-defined opinion of the Government is that the Cardenas-Menocal contract, which was concluded March 23, 1887, has become null and void owing to the lack of fulfillment of its most essential clauses and the abandonment of the work for nine consecutive years; but being desirous to avoid troublesome discussions which might give rise to difficulties, owing to the rancorous feelings which are likely to arise when one's interest is at stake, it has held aloof therefrom, and has preferred not to declare the aforesaid contract null and void, and to give Messrs. Cragin and Eyre a promise that is not to be made good until the alleged rights of the previous contractors have been cleared away or declared to be void.

The promise made to Messrs. Cragin and Eyre has been made in full confidence that dealings were being had with a well-organized and strong company, which has many elements of power and abundant capital, as it has conclusively shown by the signatures of sundry influential men who recommend it and by the deposit of \$100,000 in gold which it will make in the general treasury three days after the promise shall have been ratified.

If the contract of 1887 and the promise which is to be laid before you are cursorily compared with each other, the advantages of the latter over the former will be clearly seen.

In the first place, the future contract will be more practicable, because it offers greater inducements and better security to foreign capital that its owners may propose to invest in an enterprise of such a character, which involves so many contingencies.

In the second place, it will give the Government a double participation in the profits of the work, for while in the contract of 1887 the limit of \$4,000,000 in gold, in shares, was fixed, the contract, which will become effective in 1899, raises that limit to \$8,000,000 in gold.

While the contract of 1897 promised the canalization of the Tipitapa River, that with Messrs. Cragin and Eyre offers us something more positive, viz, a line of inter-oceanic transports from the Atlantic to the Pacific, which is to be finished three years after the organization of the company, and which will be in operation during the construction of the canal, so that the advantages to commerce of that waterway will be enjoyed seven years sooner than they would be otherwise.

The failures of the company to meet their obligations will be punished by fines ranging from \$25,000 to \$100,000, in gold, per annum, according to their character, and these fines will be deducted from the guaranty fund deposited, which fund the company will be obliged to replace, under penalty of forfeiting its contract, as soon as it is exhausted.

The causes which are to entail annulment are well determined, in order that they may not give rise to doubts and disagreements in interpretation, as did the contract of 1887. Among these causes the most noteworthy is the abandonment of the works for three years, which will render it impossible to contemplate a suspension of them for nine years, as is now the case, without any penalty whatever.

Such are, essentially, the principal stipulations contained in the promise of a contract made to Messrs. Cragin and Eyre.

I know your patriotism, and I know that if you consider these stipulations reasonable, equitable, and calculated to promote the national interests, you will give them your solemn approval. It seems that the hour has now struck when the dream of indefinite progress to be realized through the canal by the people of Nicaragua is to become a glorious reality.

The second initiative of the United States of America, that wonderful country of liberty and labor is, beyond a doubt, destined to open the way between the two oceans, as that way has been marked out by the lavish hand of nature. All our people feel confidence in that initiative; yet some among us prefer the initiative of the Government to that of private parties, thus forgetting the antecedents of that great people among whom governmental initiative is of little value when compared to private initiative, this latter being the powerful lever which has accomplished in that emporium of national life the most astonishing improvements of our time.

An important contract of another character will also be laid before you for consideration, viz, the establishment of a new bank in the city, with a capital of a million dollars in gold.

Its maximum rate of interest will be 10 per cent per annum, and 12 per cent when it advances money.

The bank will keep a coin reserve of 40 per cent, as a guaranty of the notes which it has in circulation.

The concessions which the Government is to make to it are comparatively small, and are to remain in force for twenty-five years.

The bank will be located in Nicaragua (Managua?), and will have branches in the principal cities; but it is not to be allowed to apply to the United States of the north for incorporation.

The Government will have the right to commission it to collect or manage funds or revenues belonging to the State, but the bank will receive no compensation for so doing; on the contrary, it is to pay 8 per cent per annum on the funds that the Government may have deposited with it. The bank is to be established one year after the ratification of the contract.

If it shall fail to meet its obligations, it will be compelled to go into liquidation.

A responsible institution of this kind has long been a desideratum, in order that it may prevent the only one that now exists from having a practical monopoly, as it has hitherto had, in consequence of which it has committed continual irregularities.

The establishment of a new bank will therefore meet a real social necessity.

The Government proposes to take advantage of this extra session to lay before you other important business which it has in hand and which has reference to matters of present consequence.

We are on the eve of an event of the very highest importance, which will greatly influence the destinies of our country, viz, the meeting at Amapala of the federal executive council, which will inaugurate, on the 10th of November next, the Republic of the United States of Central America.

The attempt to establish a Central American Union, which is to be made by the States of Nicaragua, Salvador, and Honduras, is a serious step, which is to be taken by peaceable means in behalf of the grand ideal of our ancestors, who bequeathed to us one country, which we have been unable to keep, owing to our civil discord.

Managua had the honor to see the meeting within its precincts of the constituent assembly which drew up the constitution of the new political entity which is to come into existence on the 10th of November next, and the Government of which I am the head gladly lent its full cooperation to that work of Central American patriotism, which was happily initiated on the 20th day of June, 1895, when the first basis of that beautiful thought was signed at Amapala.

Let us congratulate ourselves, Nicaraguans, Hondurans, and Salvadorans, on the accomplishment of that noble purpose of the most illustrious patriots; let us all contribute our mite in order that it may be strengthened, and let us henceforth invite our brethren of Guatemala and Costa Rica to cooperate with us in reconstructing our country of 1821, which is the country of all Central Americans, and which is proclaimed simultaneously by nature, by tradition, and by the future.

J. S. ZELAYA.

MANAGUA, October 27, 1898.

TRANSLATION OF THE CONTRACT ENTERED INTO BETWEEN THE GOVERNMENT OF NICARAGUA AND THE ATLAS STEAMSHIP COMPANY, LIMITED, DATED AT THE CITY OF MANAGUA, ON THE 30TH DAY OF SEPTEMBER, 1897.

The National Legislative Assembly decrees:

ONLY ARTICLE: The contract entered into between the minister of public instruction, provisionally in charge of the portfolio of public works, on behalf the Government, and Louis Wichman, representative of the Atlas Steamship Company, Limited, is, with the modifications subsequently agreed upon by both parties and the modifications introduced by the House, approved in the following terms:

Manuel Coronel Matus, minister of public instruction, provisionally in charge of the portfolio of public works, representing the Government of the State, and Louis Wichman, representing the Atlas Steamship Company, Limited, in accordance with the power of attorney exhibited, have agreed on the following contracts, with the object of expediting steam navigation on Lake Nicaragua and the River San Juan del Norte, which each day offers greater difficulties; of facilitating communication with the Atlantic coast, on which great interests depend, and in the hope of commercial and agricultural development that shall improve the condition of the country.

I.

In consideration of the great expenses that the Atlas Steamship Company, Ltd., hereinafter called "the Company," shall incur for the aforesaid object, the Government grants it the exclusive right during thirty years to navigate by steam the Silico Lagoon, counting from the final ratification of this agreement, and the exclusive right during the same period to construct tramways and railways at convenient places along the line of the River San Juan to avoid obstacles therein.

II.

The company binds itself to construct on its own account a narrow-gauge railway, that shall put the place known as Colorado Junction or another suitable point, in communication with the Silico Lagoon, so as to avoid the navigation of the dry and most difficult part of the river San Juan and effect more rapid transit to the port of San Juan del Norte during the summer. The length of this line shall be five miles, more or less, and at its terminals the company shall erect houses and piers that shall combine the requisites for passenger traffic, the transportation of merchandise, and for other services.

III.

The Government shall subsidize the company to the extent of five thousand dollars for each mile of the said railway, payable in successive monthly installments of one thousand dollars from the time the governor of San Juan del Norte advises that the construction works of the railway have commenced, and providing the works are not interrupted. In case the works are interrupted, payments shall be suspended until the works are recontinued.

IV.

The Government declares this work to be of public utility, so that the company may expropriate lands of private property required for right of way in accordance with the laws in the matter. The company shall have for the same purpose the right to occupy, free of all charge, such national lands as the line may cross, together with a strip of land one hundred yards wide along the entire length of the line.

V.

The Government also grants the company the right to cut in the national forests adjacent to Lake Nicaragua and the river San Juan, free of all charge, all the wood it may require for the use of the steamers, tramways, railways, piers, houses, and workshops, and for other purposes of the traffic.

VI.

The Government concedes the right of occupying, in the ports and places of transit, such lots of national land as may be necessary for the establishment of stores, tramways, offices, workshops, stations, etc. It is understood that such lots shall be selected by agreement with the Government, and that in case any of them should be private property, the Government shall authorize their expropriation, in accordance with which the company shall pay the just price as fixed by experts, unless the price shall have been agreed upon between the owners and the company.

VII.

The company's employees and laborers shall be exempt from civil and military service, and to this effect the respective authorities shall issue such exemptions as may be necessary to insure the good service of the company.

VIII.

The steamers, railways, tramways, stations, service houses, and other indispensable things for the purposes of the company shall, during the term of this contract, be exempt from national and municipal contributions.

IX.

The company shall import, free of local and customs dues, the machinery, tools, materials, coal, provisions, and other articles necessary for its service, excepting strong liquors, but with strict observance of fiscal regulations and the requirements of the ministry of finance for due control and statistical purposes.

X.

The company in the service of its enterprise shall have, subject to the laws of Nicaragua, the free use of the national telegraph lines, but this concession shall not prevent the Government from selling the said lines unconditionally.

XI.

When the railway from the Silico Lagoon shall be finished, should the Government consider it convenient to its interests and those of the company, it shall remove the custom-house from Castillo to a point that will hinder as little as possible the rapid transportation of merchandise.

XII.

The company is obliged to make at least three trips a month with its steamers from Granada to San Juan del Norte, and vice versa; and to call at least once a month at all the established ports of the lake which the steamer *Victoria*, or another of her size, can reach. The company shall carry the mails of the State on all trips free of charge. The aforesaid trips shall be subject to an itinerary of which the Government and public shall be notified, and which can not be altered without three months previous notification to them. For each unjustified infraction of the itinerary the company shall pay a fine of from 25 to 100 dollars, which shall be collected by the Government.

XIII.

Passengers and freight tariffs shall be in the money of the country and as moderate as the company can make them. The Government shall enjoy a rebate of 30 per cent on the transportation of its employees, other persons who travel for its account, its troops, and cargo.

XIV.

In case of war, the company's steamers shall be placed at the order of the Government, which shall take them for its own account, acknowledging, upon returning them, the losses and damages their use may have occasioned. These losses and damages shall be appraised by an engineer, chosen by mutual agreement or by two experts, one for each party, providing the parties hereto can not agree on the nomination of the former. Should the experts fail to agree on the estimate of losses and damages, the decision of an umpire appointed by the experts prior to their disagreement shall be final, and his decision can not be appealed from.

XV.

The company binds itself to undertake as soon as possible such works along the river San Juan as may be necessary to facilitate the uninterrupted transportation of passengers and merchandise during the whole year by means of vessels and railways between San Juan del Norte and Lake Nicaragua.

Should the company, after careful study of the obstacles to navigation, wish to undertake works of greater magnitude, so as to secure a depth of water of six feet in the river San Juan at all seasons and to deepen the bar of the port so that vessels of large tonnage can cross it, the Government shall give the company permission so to do.

XVI.

This contract may be transferred to any foreign person or company, but in no case, neither in whole or in part, neither directly nor indirectly, to any government. Should the contract be transferred to a company whose domicile is abroad, it shall constitute a representative in Nicaragua fully authorized and instructed for all affairs, judicial or otherwise. The said company shall be subject to the laws of Nicaragua.

XVII.

For the purposes of the preceding article the company shall have an agent in Nicaragua.

Any difference that may occur in regard to the meaning and application of this contract shall be decided by one arbitrator chosen by mutual consent, or by two arbitrators, one for each party. In this case, should the arbitrators not agree as to the amount of losses and damage, the matter shall be decided by an umpire appointed before proceeding to the arbitration, and his decision shall be final. The tribunal of arbitrators shall be established at the latest within fifteen days from the time one party has notified the other of any difference that may occur, and it shall give its decision within six months, at the latest. Such decision can not be appealed.

XVIII.

Should the railway from the Silico Lagoon to the River San Juan be not finished within three years from this date, this concession shall for that reason be forfeited.

The works of construction of the said railway shall commence at the latest within one year from the date upon which this agreement is signed, and should the company not do so it shall lose the deposit of \$5,000 gold which it binds itself to make in the general treasury of the state within six months under penalty of the forfeiture of this contract.

The said deposit shall be returned to the company when the works of the railway referred to are finished.

XIX.

This concession shall never be an obstacle to the carrying out of any contracts the Government may decide to make in regard to the opening of an interoceanic canal over the same route, nor shall it affect in the least those it may have already made.

XX.

It is understood that during the term of this agreement the Government can not subsidize any other company of steamers on Lake Nicaragua.

XXI.

In case of expropriation owing to the opening of the interoceanic canal and considering the expenses the company may have incurred, it shall be indemnified by whom it may concern for the value of the materials of the enterprise, according to such title as the company may be able to show, it being understood that the Government of Nicaragua shall not pay in any case any indemnity whatever.

XXII.

To determine the indemnity mentioned in the preceding article the procedure stipulated in Article XIV shall be followed in its entirety.

XXIII.

Should either party not appoint its arbitrator within fifteen days after having been notified of any difference arising, or should the party appointed not accept, or should he be absent, the president of the supreme court of justice shall, within three days, and upon the petition of the other party, appoint an arbitrator.

XXIV.

In no case and for no reason shall the company or whoever may represent it have the right of appealing to diplomatic intervention.

In proof of which are signed two of same tenor at Managua, on the fifth day of June, 1897. M. C. Matus, Louis Wichman, for the Atlas Steamship Company, Limited. Given in the hall of sessions, Managua, 28th September, 1897. M. Morales, D. P.—Santiago Lopez, Leandro Garcia. Approved—National palace, Managua, 30th September, 1897. J. S. Zelaya—The acting minister of public works, J. C. Munoz.

This conforms to the contract published in the Official Daily. Department of public works, Managua, 31st October, 1898.

MUNOZ.

The undersigned, minister of interior relations of the State of Nicaragua, certifies: That the signature of the minister of public works by the law which precedes this, reading "Munoz," is authentic.

Managua, 2d November, 1898.

ERASMO CALDERON.

I, the undersigned, consul of the United States, do hereby certify that the above signature of Erasmo Calderon is true and genuine.

Managua, November 2, 1898.

CHESTER DONALDSON,
United States Consul.

JANUARY 20, 1899.

The committee met at 10.30 o'clock a. m., Hon. William P. Hepburn in the chair.

Mr. CRAGIN (representing the Eyre-Cragin syndicate). Mr. Washburn, who was our consulting engineer, and also took part in the negotiations, is here this morning, and will now address the committee.

STATEMENT OF MR. FRANK H. WASHBURN.

Mr. WASHBURN said:

Mr. Chairman, and gentlemen of the committee, I want to dwell a few moments upon one feature of every canal concession or every proposition for building a canal in Nicaragua which has to do with Nicaragua and the Nicaraguans and their country and their point of view on the whole problem, not because it is interesting simply, but because I think it has a very important bearing upon determining the fairness, the legality, and the righteousness of their actions in the past. It is difficult for us here to understand how the Nicaraguans view the whole project of the canal. For us it is one thing in a thousand. For them it is the only thing of its kind. Nicaragua is a small country. It has not the population of one of our large cities. It has under 500,000 people. Of those 500,000 people a good fifth of them are non-producing entirely—Indians. Its wealth probably is not over \$10,000,000. Its exports are \$2,000,000 a year, probably.

Mr. STEWART. What are the exports?

Mr. WASHBURN. They consist of coffee and bananas and some lumber and a very little gold. Society, as in most of those countries, consists of those who are very poor, who have enough to eat and enough to wear and who have shelter, but who have nothing else, and the people who are moderately well to do. They have no industries, practically none, except those of agriculture. They are cursed with a political system which they all regret, which they all strive to overcome, and have striven in a number of ways, and which they are quite frank in expressing to strangers who are in sympathy with them. When they change parties they change constitutions. That frequently brings about what we hear of as revolutions. With us, of course, when we change parties the same old Constitution that we are devoted to stands. Each party there is devoted to its own constitution, as we are devoted to one constitution.

There is a great freedom from crime in that country. The people are simple and straightforward and honest. Men traveling through the wilderness there, with a large party of camp followers, go wholly unarmed. It is usual to leave coats or possessions of any kind on the roadside; to leave coats hanging on a tree, for instance, and those things are not stolen. A person can return in a week and find his property where he left it. There is an intense love of country there. That is characteristic not only of the poor people, but it is characteristic of the officials. The tone of the officials there is excellent, as we found in our negotiations with them. We found the men we dealt with very upright.

If there are any questions that suggest themselves to the committee as to the actions of the officials, their entire unselfishness, the entire absence of anything that had to do with the advantage of the individual, for my part I should court such questions.

The feeling toward the United States is a different one from that they

have toward any other country. To express it in a word, it is a feeling that they must be dependent upon us, and they wish to court such relations with us that they may be dependent upon us without suffering either in their sovereignty or in their interest.

These people, particularly the young men who come to our country to be educated and those that travel abroad, as many of them do, realize the difference of their own country from others. The impossibility of their own country ever reaching, without something that almost changes the laws of nature, the same standard that our nation and the nations of Europe have, is apparent to them. They feel that the advantages of their own country in soil, in climate, are entirely exceeded by the one great advantage of its having the necessary location for the future great waterway joining the two oceans.

In this country we congratulate ourselves that we have such a marvellous climate; that we have a country in which men can grow to manhood and energy. They congratulate themselves that in the whole great chain of mountains from the Arctic Ocean down to the southern end of South America, they have the one gap. Nature made that one place for a canal. You can imagine people who feel that their future, that the position that their country is to take among the nations of the earth, rests upon the construction of a canal, have a totally different view of a contract made for that canal than individuals generally would have. They do not look upon it as a contract between individuals. It is not an ordinary contract between an individual and a government. It is a contract between an individual and the government in which the individual in many respects assumes the aspect of sovereignty. More than that, it is a contract between a government and individuals in which the individuals who assume that contract assume the vital responsibilities of that nation. It is their one hope. It is the one thing that for generations every man that has lived there has felt would not only make his individual future, but would make the future of his country.

Mr. STEWART. Then do you think there would be any difficulty in the United States getting independent concessions from Nicaragua for the building of this canal?

Mr. WASHBURN. I think there is this difficulty to be met with in Nicaragua in that respect. The Nicaraguans, and all Central Americans, are intensely jealous of their sovereignty. They remember that whenever there is a discussion between a concessor and the government that, almost before the subject is heard of there, a man-of-war appears in their harbor. They remember instances in which not only has the man-of-war appeared, but their custom-houses have been taken possession of, although the question involved has been purely a civil one.

Mr. STEWART. You stated that they consider themselves dependent on the United States. If an American man-of-war went in there they would, then, regard it as friendly, would they not?

Mr. WASHBURN. I imagine that no people would consider the act of taking over, of taking from them their rights of sovereignty as a friendly act. They wish to enjoy the protection of the United States, but they do not wish to place themselves in a position where their soil would be under the control of the United States. They want the protection of the United States, but they do not care for merger with the United States.

Mr. BARHAM. But waiving the question of sovereignty, do you think that the Government of Nicaragua would have any objection to

granting a right of way, with the right to defend the canal, to the United States?

Mr. WASHBURN. That I can not answer. This much I am sure of. The Nicaraguan Government vastly prefers that they should have to deal only with individuals in questions that might come up in regard to the canal. It is characteristic of concessions in Spanish American countries that a clause is entered which in effect says that no question which may arise between the government and the concessors shall be at any time adjudged as a question for diplomatic interference. That is entirely left out of these concessions that Nicaragua has made, but she is very jealous of anything like governmental control of her soil.

Mr. BARHAM. But the mere right of way over her soil for the purpose of constructing a canal would not include sovereignty at all. That would leave the Government to control crime, and her sovereignty would not be affected.

Mr. WASHBURN. Yes, sir; but those people are intensely proud. They would ask the question, "Why, are we not able to take care of our soil?" All these concessions she has ever given are subject to the laws of her own country.

Mr. BARHAM. Take the concession just granted to the Grace syndicate, for instance. They grant very close to absolute sovereignty. They grant police regulations, and permit that company to make police regulations which the company may enforce. I do not see how that can be unless the Grace syndicate turns itself into a kind of a government down there. But they have granted that concession.

Mr. WASHBURN. If you will permit me, I will a little later describe how that clause came in, and you will see that its purpose was almost a purely technical one, an engineering one.

That brings me to the point of asking if it is not conceivable that after Nicaragua had given a contract for the construction of that canal and the work did not progress, nothing being done, that she would take upon herself the giving of another contract that would insure a canal? It is conceivable that there might be some circumstances—I am speaking now purely from the standpoint of a great national necessity; later I will get to the purely technical side of that question—which would transpire, which would put her in a position where she would be free to make a contract, as, for example, the circumstance of those with whom she had made a contract being unable to carry it out. When would that be?

When misfortunes came to the company nine years ago, of which you have heard, Nicaragua did not take that position then. She did not take it later when the machinery, when the great dredges taken down there went to the bottom of the bay—and they lie there now—she did not take that position then. She did not even take it a short time ago when the company sold its tools and instruments to the Nicaraguan Government, and when a bill was being pressed in the national treasury for a few thousand dollars for payment for those tools. She did not take that position then. And that is nearly nine years and nothing done. She did not take that position when the railroad became unusable—got in that condition where there were simply two streaks of rust—when the foundations of the buildings rotted away, and the camps on the hills went to pieces.

But at the end of nine years other people appeared there with a man known as an extremely active man, a man who has brought the only party of contractors down there that had ever gone down there for the purpose of making a proposition. He brought men of large wealth and

energy, men who were known to go into investments and said to Nicaragua: "Here are the men who can build your canal." Then they said: "Our national necessity requires us now, at the eleventh hour, to make another contract for the construction of a canal." And when you as representatives of this Government look upon it as a question of national necessity with them, they can not be blamed for that.

Turn now to the purely technical side of it, as we would consider it here in our environment, as we feel between man and man. I fail to find in the Maritime Canal Company's concession anything that would prevent Nicaragua from making a contract at this time. But I do think from the questions I heard here day before yesterday that article 4 of the Maritime Company's concession may have been by some incorrectly interpreted or translated. Article 5 says:

The State binds itself not to make any subsequent concession for the opening of a canal between the two oceans during the term of the present concession.

I do not know how the misinterpretation came, but I suspect the term of the present concession has been supposed to mean ten years—the ten years which they have to construct the canal—but it does not; it means the ninety-nine years.

Mr. BARHAM. It means the what?

Mr. WASHBURN. It means the ninety-nine years for which this is the term, and the proof of it lies right in the concession itself. Article 4, for instance, says:

The duration of the present privilege shall be for ninety-nine years, to be counted from the day the canal shall be opened to universal traffic.

In article 6 precisely the same wording is found as in article 5, where the phrase "during the term of the present concession" is used. And article 6 says:

That during the term of this concession the ports of each extremity of the canal and the canal itself from sea to sea to be neutral.

It certainly did not mean during the term of ten years the ports should be free ports and the canal should be neutral.

Mr. MANN. Doesn't it mean the same thing as during the life of the concession?

Mr. WASHBURN. Yes; during the term. The language is quoted.

Mr. MANN. That is what the committee based its questions on.

Mr. WASHBURN. The term of this concession is found in article 4 to be ninety-nine years.

Mr. MANN. That depends upon whether it is rescinded previous to that time?

Mr. WASHBURN. I do not catch your point.

Mr. MANN. Well, the original term of the concession, if it continued, was ninety-nine years, but there is authority under that to rescind the concession; so the term of the concession is ninety-nine years, with the authority to rescind it before that time.

Mr. BARHAM. The term could be rescinded within ten years by forfeiture if they did not comply.

Mr. WASHBURN. Yes. I am dwelling now simply on the question which is the first and vital point, Has Nicaragua the right to make a contract, to write a contract, to make an agreement?

I think there is another misinterpretation of article 5. The State binds itself not to make any subsequent concession for the opening of a canal between the two oceans during a term, and so forth. It does not bind itself not to make a concession during the term, but it is for the opening of a canal during the term. In other words, I see nothing in

here which indicated that Nicaragua had any idea that she was prevented from entering into an agreement during the ten years that the Maritime Canal Company had to construct its canal or the contract should be forfeited.

Mr. MANN. Do you read Spanish?

Mr. WASHBURN. No.

Mr. MANN. Then you could not answer the question I wanted to ask. That is the ordinary method of expressing it in English—they would not grant a term, would not make a concession during the term—but I do not know how it would be in Spanish.

Mr. WASHBURN. If I may tell you the basis of my authority and dwell for a moment on something else, I would say this: I was told by the legal advisers of the administration in Nicaragua that the making of a contract, as the word is used here, does not mean the writing of the paper. Not only is this a translation from Spanish to English, but it is difficult to translate a Spanish thought.

Mr. MANN. Then you think under that concession the terms of the Cragin syndicate would not take place until after the expiration of the ninety-nine years.

Mr. WASHBURN. No; simply that the Nicaraguan Government has the right to execute a legal contract—

Mr. STEWART. Not to be executed for ninety-nine years?

Mr. WASHBURN. Yes.

Mr. STEWART. Then the Nicaraguan Government must have deceived the Grace syndicate?

Mr. WASHBURN. No. Not to be executed until ninety-nine years after it is opened to navigation. There is none. There will be none. No one would think of robbing Nicaragua of the right to build a canal after the old concession shall have expired and shall have been forfeited.

Mr. STEWART. Then if you should not go on and try to execute it until next October, your concessions would be forfeited, you admit?

Mr. WASHBURN. Our concession would be forfeited for a number of reasons. Our contract is made giving us the privilege of doing certain things when the Maritime Canal Company concession shall have expired on the 9th day of October, 1895.

Mr. HINRICHSSEN. Let me ask you this question: If the United States were to furnish the money to the Maritime Canal Company to complete this canal, to complete their contract with the States of Nicaragua and Costa Rica, and the fact was beyond dispute that the money was ready, that the United States Government was ready to furnish it, and that this arrangement was completed and made before the 9th day of October, 1899, would the Maritime Canal Company's concession be regarded as good by the Nicaraguan Government?

Mr. WASHBURN. No.

Mr. HINRICHSSEN. It would not?

Mr. WASHBURN. No. There is a clause—I think I can refer to the language—which I will find. It is article 42, on this little slip I have.

Mr. HINRICHSSEN. Then you think that nothing which could be done at the present time would save the concession of the Maritime Canal Company from forfeiture?

Mr. WASHBURN. I think there is nothing. I can not imagine anything except the employment of force overriding not only the rights of individuals but the rights of Nicaragua, that can extend the Maritime Canal Company's concession.

Mr. HINRICHSSEN. I do not mean to extend it exactly. I mean if the

Maritime Canal Company were to show that they were able and intended to carry out their contract at any time between now and the 9th day of October, 1899, if the contract would nevertheless be canceled by the State of Nicaragua?

Mr. WASHBURN. It would be; yes, sir. The mere intention to complete the canal, even showing that they had the ability to complete it, would not entitle them to an extension. If the Maritime Canal Company should present itself to the Nicaraguan Government to-day and say, "We have \$100,000,000," the Nicaraguan Government might first, in order to dispose of the question quickly, ask, "Where did you get it?" "We got it from the United States Government." "Did you not make an agreement with the United States Government by which they were to have the control of your stock?" "Yes." "Then the means with which you raised that \$100,000,000 are the very means which our contract provides shall cancel it, shall abrogate it, shall forfeit it."

Mr. STEWART. No. That the concessions shall not be transferred to a sovereignty or foreign government; not the stock.

Mr. WASHBURN. Let me tell you how they look at that. It is hard for us to realize that those people hardly know what stock is. The intent of a contract even in our own law courts, when it comes to intricate questions, has everything to do with the interpretation. The intent of the Nicaraguan Government is to rob all questions in connection with its concession from interference by any other government.

Mr. STEWART. Their judges, their lawyers, can say that their concession has not been transferred to the United States?

Mr. WASHBURN. Their lawyers can not see that point any more than you could expect to see this parallel case. If it is conceivable—

Mr. STEWART. How can we deal legally with such a government?

The CHAIRMAN. I wish the witness would not be interrupted when he is answering a question.

Mr. STEWART. I will try not to interrupt him.

Mr. WASHBURN. The people of Nicaragua should not be looked upon as being anything except the most friendly and fair-minded people in the world regarding this question. That is a feeling I have very strongly. I had a prejudice against them, and I had to overcome that. A great many people have a prejudice against them.

Take a parallel case. Suppose the United States made a contract, we will say, with some German contractors in regard to some question upon which the future of the Philippines depends, and the question whether we would ever make any profit out of the Philippine Islands—some great work there; and then say that we should hear that those contractors, notwithstanding a clause that the concession should not be transferred to any foreign government, had made an arrangement with their home government by which their home government was not only going to control the stock, but was going to send its engineers down there—its army engineers; that it would control the stock, and practically have the whole directory of the company, and so on. Would you quibble over the question whether the control of the stock was the transfer of that concession? No. Our national interest in the matter would determine it. This whole question is a grave diplomatic question for Nicaragua. It is its very life.

To follow this back, what was the intent?

Mr. JOY. Will you allow me to ask you a short question?

Mr. WASHBURN. Certainly.

Mr. JOY. Is it your contention that if the Maritime Canal Company borrowed \$100,000,000, we will say, a sufficient sum to build the canal,

that Nicaragua would be justified in inquiring of that company where she got the money, in determining whether or not she would forfeit these concessions?

Mr. WASHBURN. Yes; \$100,000,000 could not be obtained without its being known where it was obtained.

Mr. JOY. Suppose it should be obtained from the Grace syndicate, so called, would they be justified in inquiring whence the money was borrowed, supposing it was a simple loan?

Mr. WASHBURN. For the purposes of your question, I can answer no. But they would say: "The fact that you have \$100,000,000 is of no interest to us. Your agreement with us provided that you should receive an extension provided you had invested in this enterprise; not invested in the sense of stocks or bonds, or simply putting up money, but if you had buried in the soil here thousands and millions of good money. If you had done that and were unfortunate enough at the end of ten years not to have your work completed, we should give you a chance to go ahead.

Mr. JOY. Then, even if the Maritime Canal Company had \$100,000,000 to-day in their treasury and had only progressed as far as they have progressed, Nicaragua would to be justified and ought to forfeit their concessions on the 9th of October, even if they were willing now to go ahead with the work?

Mr. WASHBURN. Yes, sir.

Mr. JOY. And it is practically forfeited to-day?

Mr. WASHBURN. Yes, sir.

Mr. STEWART. Why didn't you have a declaration of forfeiture made by the Nicaraguan Government when you got your concessions?

Mr. WASHBURN. Such a declaration, for all the purposes for which we could imagine such a thing would be required, is contained in the concession.

Mr. BARHAM. Under the first article it says: "which contract shall terminate October 9, 1899." It seems to me that is a legislative declaration that the Nicaragua Canal concession is forfeited. Your point is that the Nicaraguan Government does not want to lose control of this canal as a government?

Mr. WASHBURN. It does not want to lose control of the soil in which the canal is any more than they want to lose—

Mr. BARHAM. Or the use of the soil?

Mr. WASHBURN. Or the use or the sovereignty of the soil.

Mr. BARHAM. Now, let us see if that is so. Take the thirteenth article of your own concession. It says the company shall have exclusive control. These are the very words:

Of the construction, management, care, protection, improvement, use, and operation of the canal, and of its accessories and appurtenances, and it shall have also the exclusive power to formulate rules and regulations for the aforesaid objects and the management of the enterprise, for which purpose it shall be vested with all the powers and privileges that may be necessary. The Government shall lend its aid to the end that the regulations which the company formulate and submit for approval shall be observed and enforced.

Now, if that is not a complete grant of user and for occupation I do not know what words you could use.

Mr. WASHBURN. If one of the employees of that canal should commit a theft, or if a man should be disorderly, if he should disobey the laws of the country, he would be subject to the laws of the country, just as a clerk in the store—

Mr. BARHAM. But they give control of the use and occupation of that canal?

Mr. WASHBURN. Yes; that is, for the purposes of constructing a business enterprise, of carrying vessels from one ocean to the other. I think some time ago you asked about the police clause.

Mr. BARHAM. That is the very clause I had reference to.

Mr. WASHBURN. I want to dwell for a moment upon the history of that, because I think the history of that expresses best its intention.

We have seen enough attempts to build great works in tropical countries to know that the vital question in the construction is whether the human beings who are going to bend their muscles to the work can be kept in such training, such health, can be so guarded in their health and in their habits as to make them efficient workmen; whether they can be kept free from pestilences and fever, and free particularly from that running riot of dissipation that is so common where great bodies of men are taken away and live together remote from home. We were told, when we went to Nicaragua, that we should not for a moment attempt to take over to ourselves any of the aspect of sovereignty of the soil. They said, "If you do, they will be suspicious, and you will never be able to close the concession."

But we said, "It is absolutely necessary that we should have such regulations, not only that our men shall be healthy, but that there shall be peace and quiet and freedom from excesses, that men will take their families there." It is almost impossible to take up mere floaters in this country, enough of them, to conduct the operations in that country, to man the dredges, and do all the expert mechanical work that is required; therefore we must depend on settled men, men of families. We had in mind the experiences at the Panama Isthmus, where men died in droves.

The members of this company knew very well that if an epidemic ever ran riot among their workmen, it would be almost impossible to get anybody to go there. A dozen cases of yellow fever among those inhabitants, and the knowledge of it coming to this country and being dwelt upon in the press, would mean an instant loss of thousands, possibly millions, of dollars to us. And so it seemed to be absolutely necessary that the company should have police powers. However efficient their own police there might be, they have no appreciation of the American laborer; they do not know how to control him; they do not know how to take care of offscourings.

A military government will be necessary. That means 30,000 laborers, and, gentlemen, on work of that kind you can assume that there are five persons to each laborer, and so, if there was to be put into that country suddenly 150,000 active, vigorous people, having no natural sympathy with the peculiar customs of the country, and increasing the population instantly one-third, it was felt to be necessary that the company should be free to control its own men. That was the way that that police clause was put in, and also the provision in relation to the zone of 10 miles wide. It was explained to the Nicaraguan officials. They objected to it violently at first, but when it was explained to them they saw it, and when it was once assented to it was never referred to again.

Mr. BARHAM. In that connection, why would the Government have any objection to giving the same police regulations and the same use and control over a similar zone to this friendly Government, which you say the United States is to Nicaragua—

Mr. WASHBURN. That would be governmental control by another government over their own soil.

Mr. BARHAM. As contradistinguished from individuals—

Mr. WASHBURN. Yes. They look upon this very much as we look upon enormous concerns in our large cities—for instance, like the Union Stock Yards in Chicago. There were 70 private police in those yards, with full police power. It was well known, as a matter of fact, that they would not do anything opposed to the interest of the company. Those men were practically the servants of the general manager.

Mr. MANN. You understand they were all sworn in by the police department of Chicago and under the orders of the chief of police?

Mr. WASHBURN. Yes, sir.

Mr. MANN. Only paid for by the stock-yards company, that is all?

Mr. WASHBURN. Yes, sir. These people are clothed as fully with police powers as those watchmen were clothed with that power.

Mr. MANN. Is that provided for in the concession?

Mr. WASHBURN. Yes. The consummation of the contract clothed those men with the power.

Mr. MANN. Does this concession authorize the company to appoint the police?

Mr. WASHBURN. Yes, sir.

Mr. MANN. Under its own orders?

Mr. WASHBURN. Yes, sir.

Mr. MANN. The company has the authority to make the regulations?

Mr. WASHBURN. Yes, sir.

Mr. MANN. The Government does not reserve that authority, does it?

Mr. WASHBURN. No; but these regulations can not be contrary to the laws of the country. It was understood throughout that this company could occupy the soil of Nicaragua subject to her laws. If a murder is committed there, the Nicaraguan courts try it. Our men might arrest the murderer or their men might come in and arrest him, but the Nicaraguan courts would try his case.

Mr. MANN. Suppose your men should get on a drunk. Who would try such cases as that?

Mr. WASHBURN. The probability is, as a matter of fact, that they would not be tried in the sense we try them here. The police of Nicaragua have somewhat the powers of—

Mr. BARHAM. Powers of a justice of the peace?

Mr. WASHBURN. Somewhat so, and yet not so broad as that. And the question was opened and discussed as to whether, in minor cases of mere drunks and disorders, it would be worth while for the Nicaraguan justices to try them, or the Nicaragua officials who might correspond to the justices. That may seem strange to you, but men who are in the habit of taking contract work and dealing with the rough fellows; good enough, who take part in such works, know that every time a man gets on a drunk, when he is inflamed with liquor, that he is troublesome. You can not take him into court and fine him. That is not the sort of way to get along with that sort of human beings. And as a matter of fact, when we go out on a piece of railroad work, for instance, and have a number of thousand of our men working, we are a law to ourselves. We do not want the police to interfere. There is nothing accomplished by the police interfering.

Mr. HINRICHSSEN. Then, as I understand it, your concession will be giving you a sort of municipality, bearing the same relation to the State of Nicaragua as an ordinary town or village government bears to the State in this country?

Mr. WASHBURN. It seems to me that that might be an aspect of it. I know this much, that the only purpose of that police clause is to enable us to keep out bad characters, to prevent difficulties, to prevent

men from being shut up in Nicaraguan prisons when they have committed acts which could be attended to or punished much better by the company. In other words, this would enable a practical control, and a keeping in good health and order of the men who build the canal.

Mr. BENNETT. If you have any more suggestions to make, you may file them and have them printed with the hearing.

Mr. WASHBURN. Thank you.

STATEMENT OF HON. WARNER MILLER.

Mr. MILLER said:

Mr. Chairman and gentlemen of the committee, some two years ago I had the privilege of appearing before this committee and urging upon it the necessity of aiding in the construction of the Nicaragua Canal. No legislation was had at that Congress, and the matter went over. I am very glad that I do not have to appear here this morning to urge upon Congress the necessity of building the Nicaragua Canal. The events of the last few months have demonstrated that so clearly that I believe now a vast majority of the people of the United States are in favor of the construction of the Nicaragua Canal, and I understand that this committee unanimously resolved that in some way it ought to be done.

And therefore what I have to say this morning will relate to what I think to be the best method of accomplishing this work; but before speaking of that I desire to state something in regard to what has been done in the past, particularly in regard to the work of what is known as the Nicaragua Canal Construction Company. In 1890 I became president of that organization, and it was under my administration that most of the money was raised and expended. Mr. Hitchcock, the president of the Maritime Canal Company, gave you yesterday the total results of the expenditures as they were reported to his company by the Construction Company. When I became its president, the company had just been chartered by Congress—I refer to the Maritime Canal Company—and the work was being taken up. The concession required that \$2,000,000 should be expended during the first year after the beginning of the work. At that time a subscription was made for the stock of the Nicaragua Construction Company. Four million dollars of the stock was subscribed for at 50 cents on the dollar, making \$2,000,000 which would come in under these subscriptions.

During my administration that \$2,000,000 was subscribed and expended. And in addition to that, before the company was compelled to suspend and pass into the hands of a receiver, the company raised something like a million and a half of dollars more. The exact amount does not now occur to me, but it was somewhere from a million and a quarter to a million and a half. That money was raised by issuing certificates or bonds of the Maritime Canal Company. The Construction Company, under its contract, was entitled, as the work went on, to receive bonds and stock of the Maritime Canal Company. The mortgage had not then been made, and, of course, the long and permanent bonds were not issued, but the Construction Company did receive from the Maritime Canal Company a certificate setting forth that it was entitled to receive a certain amount of bonds, and upon the strength of that I proceeded to issue certificates for those bonds. These certificates were to be redeemed at a certain time—to be redeemed either in cash with interest or they were to be exchanged for the long bonds of the company when those bonds should be ready for delivery.

I placed about a million and a quarter dollars of those bonds among the friends of the enterprise. I traveled over this country some three or four times; I spoke upon the necessity of the canal in substantially every important city of the United States, and before all the leading chambers of commerce, and I appealed to the friends of the enterprise to come in and take these bonds in order that the company might have more time to obtain money for the construction of the Nicaragua Canal.

At all events I raised about a million and a quarter, and that was put into the work. In the meanwhile we undertook negotiations here and abroad for the placing of the bonds. You have already heard of some of the difficulties that were found in the raising of this money. Mr. Mason told you some of them yesterday. I did not hear the whole of his remarks, but as I had charge of those negotiations, I can give other reasons than those that were given yesterday for the failure.

Soon after I became president of the Construction Company we opened negotiations with some bankers in New York, and finally with the Baring Brothers, in London. They sent an engineer and lawyer to our office and spent a month or more upon our plans and charters and rights and concessions, and then they went home and reported to their principals in London. But within about thirty or sixty days from that time the Baring Brothers failed, and of course our negotiations failed. And I need not say to this committee or to Congress that from the failure of the Baring Brothers and from 1873 down to the present time there has never been a moment until we have arrived at it now when an enterprise of this kind could probably have been successfully floated with the public. Times have been hard. Failures took place all over the world, and enterprises of this kind were not sought after. Then it must not be forgotten that just at this time, during this time, the great scandal connected with the Panama Canal came around, and it was found \$256,000,000 had been raised in France by the De Lesseps party, and an investigation made by the French Government showed that nearly the whole of that amount had been stolen or wasted. And so discredit was brought upon an enterprise of this kind.

We labored along with this enterprise as best we could. I have given substantially ten years of my time to it, and a very considerable amount of money, and I have to regret now that my exertions have brought so many of my friends into debt and that I procured from them subscriptions upon my enthusiasm and my faith and belief in the matter, in making them believe it would finally work out. One of the most injurious things that happened to the company in the way of procuring money abroad or elsewhere was that the Congress of the United States took up this question.

I had been president of the company not more than sixty days when, coming to Washington on some business, I met my old colleague, Senator Edmunds, and he said, "I see you have taken the presidency of the company." I said, "Yes." He said, "How are you going to raise the money?" I said, "The same as railroad companies raise it. Of course we shall have to sell our securities at such a price as will make it speculative, and people will take it up with the hope of making money." He said, "The Government of the United States ought to be interested in it, and ought to have something to do with it." I replied, "The Government of the United States has negotiated one treaty and it has failed, and it has never shown any active intention of doing anything." Nothing more was said. I returned to New York, and in a few days I saw that a resolution had been introduced in the Senate by Senator

Edmunds calling for the appointment of a committee to make an investigation as to what had been done in the way of building the Nicaragua Canal, and to arrange as to what the Government of the United States ought to do, if anything, with regard to it.

I was called before the committee, as well as Mr. Hitchcock and others, and a long examination went on, and negotiations, and finally the committee reported that the Government of the United States ought to have a part in it, or it ought to control it, and we were approached to know what we were willing to do. And after much consideration and consulting with the stockholders of the concern we made various propositions, and it finally resulted in a proposition that if the Government of the United States, backed up by the people, felt it ought to own and control this canal, that it could do so by returning to the projectors of it the money that they had invested in it and taking over the enterprise of carrying it on.

And from that day to this bills have been introduced here and in the Senate, and some years ago a bill to that effect passed the Senate, but never received any consideration in the House.

I said this was injurious to the company. It was injurious in this way. The moment the bill came out in the Senate which substantially confiscated the enterprise—that is to say, it was to take it over, returning to the projectors the money they had put into it—it made it evident to every financial man that if they put their money into it and went on with it for any length of time that the Government of the United States might step in through its right to amend the charter of the Maritime Canal Company, and that it had already said in the Senate, by the bill that had been reported in committee, that if it did it it would only recompense the projectors by returning to them the money without any profit. So when I approached financial men, with that action before them, it was impossible to accomplish anything. They said: "We only take up matters of that kind when there are large prospective rewards. We may go on and spend \$50,000,000 or \$20,000,000 here and get this enterprise to a point where the United States will see that it is going to be a success, and then they will step in and take it away from us."

All sorts of difficulties of that kind came up, and it came to a point where finally it seemed that nothing could be done unless the Government took it up.

The question now, it seems to me, is this: It is admitted that the canal ought to be built. It is a question how it can be built in the shortest time and with the least cost of money. The old Maritime Canal Company is met now with the fact that a new concession has been granted by Nicaragua to what is known as the Grace Syndicate and a declaration by Nicaragua that their rights are to cease on the 9th of October of this year. I do not propose to go into any discussions of those concessions or the various rights under them. That has been done here by lawyers of ability, and the concessions are open and are printed, and the members of this committee are perfectly competent to take those questions and decide them for themselves.

A few words upon the history of the present condition of affairs between the Maritime Canal Company and the Grace syndicate perhaps will explain matters somewhat. Last summer when this movement had been begun, and Mr. Cragin and Mr. Eyre had gone to Nicaragua, I was asked one day to meet a number of gentlemen in New York, and I did so. They then told me they had a syndicate, that they had sent a man to Nicaragua for the purpose of procuring a new concession for the purpose of building the canal, and that the old company had failed

and Nicaragua held its concessions were invalid, and they had made up their minds to attempt to get a new concession and go ahead and build the canal. But they said, after full consideration of the matter and consultation with some of the Government people in Washington, they had come to the conclusion that it would be better all around for them to join the old Maritime Canal Company, and instead of having a contending faction or two factions, that they should be brought together.

I said that I was very glad to hear that, that I had been laboring for ten years to bring in that class of men—he had given me their names—and if I could have obtained such men ten years before, the canal would have been finished. They asked me upon what plan or basis they could come into the organization and have a part of it and then go on and obtain an extension of the present concession with such alterations and amendments as might be desirable.

Without wearying you about that, I expressed my great desire to have that thing done. Meanwhile, I had passed out of the management of the Nicaragua Construction Company. At the meeting last March I had been elected a director, but I had declined to serve for personal reasons with which I need not trouble this committee, and which do not interest it. Nevertheless, my great interest in this matter was no less than it was when I was giving my whole time to it.

I will not claim that I was more patriotic than anybody else or that I went into it without the idea of making money. I realized the great magnitude of this enterprise and the vast profit I thought would come out of it, and I hoped it would go through, and I recommended my friends to go into it. I believed that it would be as great a success as the Suez Canal has proven to be. But I have been substantially worn out with my labors, and I said to the Senate committee, in writing and personally, that the Government was welcome to take it if they gave me nothing for my rights, although I did not believe the people who had gone into it by reason of my actions and others should be left without recompense and return.

As I said, I went out of the management of the company. These gentlemen then authorized me to see if some proper arrangements could not be made by which they could come in and buy a part of the old organization and put up their money and get an extension on new lines and then proceed to build the canal. I believed at once that it was the best thing for us all to do—for the Maritime Canal Company and for those people. If this were done and the new concession were obtained, or extension of the old, with this new blood in it—and the list contained many of the richest men in the world—they could proceed to build the canal from their own funds if they saw fit. Secondly, if the Government of the United States should come in and say they wanted the enterprise and should take it, that then the Government would find a perfect chain of title; that through the two concessions there would be no dispute, and that the Government could take it over and proceed to complete it for itself, and thus the difficulties would all be obviated.

I have no complaint to make of anybody or any interest, but in an enterprise of this kind, where there are a thousand or more stockholders in the two companies, it is natural that there should be disagreement, and the result was I failed to bring about any arrangement for bringing the two interests together, and then I retired entirely from any connection with the gentlemen who were seeking this concession.

It appears that this negotiation having fallen through, they went to

Nicaragua and secured this concession, and then they came to me again and said they thought now it were better if the two interests were put together, and they asked me if I would not take an interest in the new scheme and concession. I said, "Yes; you have your concession now; I was against it, but having obtained it, I will take an interest in it, and I will do what I can to bring about a combination of the two interests."

I took my interest with these gentlemen, and I think every business man and every sensible man will believe that was a wise thing to do. It cost me money. I took it not so much because I believed I would make anything out of it, but because I hoped to be instrumental in bringing these two interests together, so if the Government took it it would have it all, or, if not, that it would go through with private resources.

Of course my ambition had always been to build this canal through a corporation, without the aid of the Government. I did not think it would be any great credit to me to be simply the instrument of completing it through the Government. I desired to do it the other way. But knowing the mass of the people of the country had come to the opinion that the Government ought to own it and control it, I did not propose to stand in the way of it; and so far as I have talked with any of the gentlemen who belong to the syndicate that has this new concession every one has said frankly, "If the Government want to build this, they will have no trouble in arranging with us. We will not stand in the way of it. We think now the canal ought to be built, and if the Government propose to do it they will have our hearty cooperation. But if the Government can not come to an agreement as to how to do it, then we stand ready to go forward and see what we can do."

In a legislative way the situation, it seems to me, is this: Here is the Maritime Canal Company, which company has expended something over \$4,000,000, as I can certify. It has some property, and has, no doubt, vested rights. What they may be I do not undertake to argue. But if the Government undertakes to take over this enterprise now, ignoring both the Maritime Canal Company and the Grace syndicate and their rights, it seems to me interminable trouble will come at once, and instead of promoting this enterprise it will delay it for years. I assume, of course, the Government of the United States is not going to take its right from Nicaragua by force of arms, or by the use of men-of-war or of soldiers; that it is going to treat the sister Republic with all dignity and courtesy, and make its negotiations with them if it undertakes to do anything. I think that we are in honor bound, as the Government of the United States. I say the Government of the United States; perhaps that is putting it a little wrong, but the Senate of the United States started in this investigation, and in the proposition of taking this thing over, and, as I have explained, substantially, have prevented us from doing anything; and if the Government now proposes to take it up it should arrange with both the concessors, and it should also arrange with Nicaragua and Costa Rica. Both of those concessions prevent the turning over of those concessions to any government; the one to the Maritime Canal Company in express terms, if I recollect right—and if I do not I hope Mr. Cragin will correct me—prevents it being turned over to any other government except by the consent of Nicaragua.

It seems to me that the Government can not proceed in this matter—that is, to build it of itself, distinctly from any corporation—without, of course, getting a release of all these concessions and having them set aside and beginning negotiations anew with Nicaragua for concessions which I suppose would come in the form of a treaty.

Now, you remember that under the administration of President Arthur such a treaty was made, and it came to the Senate of the United States at the time I was a member of that body. Unfortunately it was allowed to go over the session, and at the beginning of the next session, when President Cleveland went into office and Mr. Bayard was Secretary of State, that treaty was withdrawn and was never returned. If it had been returned at that time the canal would have been completed and in use at the beginning of the late war.

But if the Government is to take up this matter it must do it in one of two ways: It must arrange with these concessors and with Costa Rica and Nicaragua, or else it must look to some corporation, either the old corporation of the Maritime Canal Company, which is chartered by Congress, or some other corporation—and then by carrying out or bringing about what I undertook to bring about—that was a uniting of these two interests—so that both concessions would belong to it, and then to proceed to build it through the instrumentality of such corporation.

There seemed to be a good deal of argument and objection here to that, but I think it is because it is not comprehended. If this Government undertakes to build this canal through the Engineer Department of the Army, and I say it without any criticism upon the Department or upon the Army, I am sure the gentlemen here familiar with public works will bear me out; it will cost at least 25 per cent more than to build it through a corporation, and 25 per cent to 50 per cent longer to do it. What we want now, I suppose, is cheapness of construction and as short time as possible. I believe it can be done in that way, and therefore I believe that some such bill as the Morgan bill, with its amendments, which gives the President power to deal with these concessors and the Government of Nicaragua and Costa Rica, will bring about the quickest action and at the same time the best action. The Suez Canal is run through a corporation. The English Government owns a large part of the stock, and receives further great benefits in the way of dividends. The dividends paid by the Suez Canal for a number of years now have been from 18 to 20 per cent every year.

I am here to plead for any proper legislation which will bring about the speedy construction of the Nicaragua Canal. We may not need it again for a generation or for fifty or one hundred years for purposes of defense; but we need it now. We need it immediately for the cause of commerce and trade. We are to see within the next fifty years the greatest development of commerce in the Pacific Ocean we have seen anywhere in the world, and if we are to have our fair share of it, if our people are to be benefited as they should, we have to have the shortest and quickest and the cheapest route of transportation, and that will give it to us. And I believe, if power be given the President of the United States, that all these divergent interests will be brought together and that it will go on successfully.

If, however, the Government of the United States decides through its Congress that they do not want to build the Nicaragua Canal, then of course it is an open field for the capitalists of the country, and the concessions obtained by Cragin and Eyre and held by the Grace syndicate will, in my judgment, be acted upon, and the canal will be built. But realizing, as I always have, or of late years at least, that there has been a growing sentiment among the American people that the canal should be built by the Government, I do not propose to stand in the way of it.

I do not, however, put any faith or credit in any benefit coming to

us in times of war because of owning the canal ourselves or our Government controlling it. If that unfortunate time should come when the nation goes to war, the Government that has the navy to take possession of the canal will hold it. Treaties and guaranties as to its neutrality will be simply chaff and blown away. The guaranteed neutrality of the Suez Canal to-day would not go for anything if England were to get into war with Russia or France or Turkey in the Orient. Does anyone believe she would leave the canal open to her enemies? No. She would hold both ends of it with her war vessels and her enemies could not go through there. That is what would happen to the Nicaragua Canal if war should come about.

This talk about neutrality sounds well, but amounts to nothing when war comes, because war vitiates all treaties and ends all treaties.

It is just 12 o'clock, or within a few minutes of it, and I might talk upon this for days or for weeks. Altogether I have talked on it more than a year. If there are any questions, I should be glad to endeavor to answer them. I have simply come here to state my own position, and to indicate in my own humble way how I think this thing might be done, and how it might be worked out if Congress is willing to give the power to the President of the United States to make the proper negotiations.

Mr. STEWART. You do not agree with Mr. Washburn that the concession to the Maritime Canal Company is worthless now?

Mr. MILLER. It would certainly hold good until the 9th of October by the consent of the Nicaraguan Government. As a business matter a man always wants to get trouble out of the way. If I had the money and had been in control of the Maritime Canal Company a year ago, I would have negotiated an extension of that concession by paying the money the Grace syndicate have paid. I would have acted on business principles, and I would have begged from door to door to have fixed that permanently as it should be. But I am not finding any fault with that. We have all put up a good deal of money, and many of us have put more than we should have, because many of the men who have gone into it have put in so much money that they have been financially embarrassed. But certainly that holds good until the 9th of October.

As to the right of extension, I do not care to go into that at all. I am simply a business man; I am not a lawyer. As most of the members of the committee are lawyers, they can judge of that. Certainly there is property there, and surveys, an immense amount of engineering work that has been done. And now that this Walker Commission is ready to report, the Government is going to be in possession, if it wants to build it, of the greatest amount of engineering work on any public enterprise that was ever done on any such enterprise before people were set to work on the enterprise itself. No Pacific Railroad was ever half as well exploited as this. I am proud to say the work done under myself there, the engineering work, was done so well that Admiral Walker told me the other day that so far as they have followed our lines and maps, their maps would lie over ours just as if they were copies.

But this committee will demonstrate with the figures given the absolute feasibility of this and the absolute ultimate maximum cost of this work, and the increased cost which this commission has put upon this work over and above that put upon it by my company will be found to be due almost entirely to the fact that this commission recommends a larger canal. Our plans call for a 30-foot canal in depth and with the channels as wide as the Suez Canal, I believe. That canal

has only 26 feet of water, and they are now increasing it to 28. They have not thought of 30 feet depth. But our plans involve 30 feet depth. Our locks were to be from 600 to 800 feet long. But if the Government wants to make the canal twice as large as we planned it and to pay for it, of course that is all right. That is what I expect an Army engineer to do. That is what he lives for—to spend money.

(At 12 o'clock the committee took a recess until 2 p. m.)

AFTERNOON SESSION.

The committee met at 2 o'clock, Hon. William P. Hepburn in the chair, for the purpose of continuing the hearing on the subject of the Nicaragua Canal.

STATEMENT OF MR. J. W. MILLER OF NEW YORK.

Mr. MILLER said:

Mr. Chairman and gentlemen of the committee, the ground has been so well covered by the gentlemen who have preceded me that there seems little to say on the great subject of the Nicaragua Canal, except, perhaps, upon the basis of one who has been interested in the subject since 1872 and has kept up his connection with the project since that date.

I was at that time in the United States service, and I was on the original survey party that has been referred to so much lately, the survey conducted by Captain Lull, of the Navy, a portion of which route is, I understand it, recommended by the commission under Admiral Walker.

The CHAIRMAN. Could you briefly give to the committee the Lull route—what it was?

Mr. MILLER. Yes, sir. Touching that subject very briefly, I remember yesterday you asked certain questions in connection with the topography and inhabitants of Nicaragua. Therefore, with your permission, I will give you a description of the route, briefly, as it appeared to us then, with a little discussion as to the geography and physical features of the Nicaragua Canal.

Nicaragua lies between 11 and 15 degrees north latitude and, as you know, at that region is the only break in the Cordilleras between the Arctic Ocean and Patagonia. At this point, instead of keeping along the coast they trend eastward, and have a very low altitude west of the lake. On the west coast the chain of mountains is entirely broken and we have an elevation here of only 40 feet. This point is Rivas, near the Lajas River. When we went to Nicaragua in 1872 there were five proposed routes between Salinas Bay and a point to the north of there, known as Ochomogo, and those five routes were surveyed carefully across this narrow strip of land, which at its narrowest point is 11 miles from the Pacific Ocean. The ones that were not feasible were eliminated until two routes remained, the Medio route, running close to the Lajas route, and the Lajas route itself. That is the Lull survey, which took place in 1872. It embraced all the low ridges from Salinas to Ochomogo.

The CHAIRMAN. What is the elevation above the lake?

Mr. MILLER. Forty feet. The lake itself is 100 to 106 feet above the mean tide of both oceans. That lake is twice as large as Long Island Sound. It is over 100 miles long by 40 miles broad, and drains the

large area which you will see here on the map [indicating on map], amounting to about 3,000 square miles. On account of its size it is a constant reservoir, never rising above 6 or 7 feet—between 116 and 117—which is the highest it has ever been above its normal condition. You can therefore see that, whatever flowage there is out of this river, it is not subject to freshets on account of the lake being a constant reservoir, and the river never rises more than 6 to 10 feet above this point.

There is another peculiarity about that river that does not exist anywhere else in the Tropics. All this country from Costa Rica on one side and Nicaragua on the other side of the lake drains into the lake. There are no tributaries into this until we get to the San Carlos, which is some 75 miles from the lake. The river runs through a very narrow ravine to that point. This state of affairs does not exist anywhere else in the Tropics. There are no freshets at all for the first 75 miles of that river. There is plenty of water from the lake over to the entrance of the San Juan to about 6 miles. From there on there is a varying depth of from 4 to 10 feet, which is caused by the countless set of centuries toward the mouth of the river bringing down the gradual flow of mud toward the Atlantic. The river then for the first 4 miles runs through low alluvial lands and is virtually a part of the lake; that is, there is very little current. We then come to the first rapids, which are slight ones but quite long, known as the Toro Rapids, in which there is about 8 feet of water. I am quoting now from memory of the time I was there. Then there is a stretch of about 1 mile and we come to a rapid fall in three-fourths of a mile. After passing those rapids we then have deep water for 4 or 5 miles, varying at the present time from 19 to 20 odd feet, and then a succession of two rapids, known as the Machuca and Balas rapids.

Along there the river is filled with rocks and islands, as you can see on this map. This is the Balas Rapids, and here are the Machuca Rapids, about here [indicating on map]. After we leave the Machuca Rapids we have a distance of 18 miles of what is known as the Agua Muerte, or dead water. In that portion of the river there is at present a minimum of about 18 feet, varying from that to 90 feet. We then come to this point, just above the San Carlos River. Now so far we have had the western divide with this elevation of 40 feet. The lake is free navigation, and the river running there—this narrow channel—and two high elevated banks, except for the first 10 miles, which is part of the swampy lands of the lake. The entrance of the San Carlos River probably marks what was once the eastern end of the mainland.

The whole character of the country changes from this point eastward to the Atlantic. It is low, alluvial land, which has probably been pushed out by the mouths of the river in past ages. There is also another large river, called the Sarapiquí, entering the San Juan from Costa Rica. It is perfectly feasible to throw a dam across at the end of the Agua Muerte just above the San Carlos and raise the water any desirable height so far as overflow of the banks is concerned, whereas below the San Carlos we get into low, alluvial lands. The question with the survey at that time was how to avoid that river.

Mr. BARHAM. What river is that?

Mr. MILLER. The river San Juan, from San Carlos to Greytown.

Mr. BARHAM. Below San Carlos?

Mr. MILLER. Yes, sir. The trial line was made in the region north of the San Juan River, in the region which was ultimately used by Mr. Menocal, and another line was run from San Carlos a little north of the

river, and then over these low hills and to the point I indicate here, which is the old mouth of the San Juan, now known as the San Juanillo, which carries very little water, because the main river broke through some years ago and now empties at the Colorado Basin, 20 miles below San Juan. The canal then ran from the San Juan, where the San Juanillo joins it, direct to Greytown, which is the common terminus of the Lull route and of the present proposed route of the Maritime Canal Company. So the difference between what is known as the Lull route and the Maritime Canal route exists only from the mouth of the San Carlos to Greytown.

Both routes are feasible; the lower route has some elements against it, and so has the upper route. The lower route is longer; on the other hand, it is easier to dredge. The upper route has the advantage of having the final locks within 13 miles of the Atlantic and giving more free navigation. If the upper route is used, we will have free navigation from the final lock, 13 miles from the Atlantic, through the San Francisco Basin, up the San Juan, across the lake, to a point within $2\frac{1}{2}$ miles of the Pacific, a distance of some 154 miles, leaving only 13 miles on this end and some $2\frac{1}{2}$ miles on the western end.

Mr. LOVERING. The lower route is more difficult to keep open, isn't it?

Mr. MILLER. There is a difference of opinion on that. In my opinion it is feasible to keep it open. It is not such a perfected scheme for the end of the nineteenth century as we might wish for. It would be more difficult to construct, I think. It would be perfectly to keep open. If it is once constructed it will be a suitable, good route.

Mr. LOVERING. Won't it fill in?

Mr. MILLER. No, sir; I don't think it will, because the whole ground in this region, if you can keep the river freshets away from it, is very solid and strong. All tropical land, after it has been lying for any length of time, becomes very compact. The element of danger in frost, which exists in our northern climate and which breaks up ground on the surface, does not exist there.

The canal which has already been completed by the construction company for 3 miles from Greytown has been completed since 1893, and is in excellent condition to-day. Of course, the canal is at the level of the sea; in fact, all the land from the Atlantic to the point back to the present lakes is at sea level.

Colonel Hepburn asked me something the other day about the inhabited region of the canal, I think it was. This region here—this region on the east side of the lake, adjacent to the river—is practically uninhabited, with the exception of the small town known as Castillo and the town of Greytown, and with the further exception that the rubber men and hunters are found there.

Castillo is a small town of a few hundred inhabitants. Nearly all the population of Nicaragua lies from Salinas Bay northward, the town of Rivas and Virgin Bay being a few miles south of the canal, while Ochomogo lies to the northward [indicating on map]. Then we come to Grenada, which is a large city, and which lies northwest from the lake. Then we come to Managua, which is the capital, which is on the lake of that name. This region is quite highly cultivated through here. They grow coffee and chocolate and indigo principally. That region has fairly good roads, and Rivas is quite a town, a town of two or three thousand inhabitants, as I remember it.

Mr. HAWLEY. Are any of these industries prosecuted on an extensive scale?

Mr. MILLER. In the northwestern part of Nicaragua they are carried on quite extensively. The chocolate plantations belonged at that time to the Menier Company, the French chocolate company that you see advertised so much. The coffee region is here [indicating on map]; the western region of the lake and also to the north.

The CHAIRMAN. What is the character of the country lying north of the river San Juan and east of the lakes to the Atlantic Ocean?

Mr. MILLER. This region here [indicating]?

The CHAIRMAN. Yes, sir.

Mr. MILLER. That is a high, mountainous country, the peaks rising to four or five thousand feet in places, about due east of the middle of the lake.

The CHAIRMAN. Are there roads there?

Mr. MILLER. Only cattle paths. I have never been there, but from what I hear I understand that there are cattle paths, and that this is a large cattle-growing country [indicating on map].

The CHAIRMAN. Are there any means of communication between the Atlantic and the lakes north of San Juan excepting these paths?

Mr. MILLER. No, sir.

The CHAIRMAN. No railways or highways?

Mr. MILLER. No, sir. They are paths cut through the woods which we would hardly call roads. I know the rubber men come down through these paths from this region here to Greytown.

The CHAIRMAN. By what route does the produce now reach a market?

Mr. MILLER. In two ways. Most of it reaches the market from Corinto and Salinas Bay, Virgin Bay, by means of steamers that go up and down the coast. There was, and I hear there is now, quite a large steamer, drawing some nine or ten feet of water, on the lakes, which brings products to San Juan, and there is a small set of steamers running down the river, making a portage at Castillo Rapids, and then coming down to Machuca, and then such freights going up by means of small steamers through the San Juanillo, which has only some four or five feet of water.

Mr. BARHAM. Are there no railroads in Nicaragua at all?

Mr. MILLER. There is a railroad from Corinto to the capital and to Grenda.

Mr. BARHAM. No outlet to any other portion of the world?

Mr. MILLER. No, sir; there is no railway, not to the east; no, sir. During the previous hearing the matter was brought up as to the comparative length of the route of the canal in Nicaragua and that of the Panama Canal.

Now, it is perfectly obvious that the Panama Canal is longer in a certain sense than the Nicaragua Canal.

Navigation through such a large lake as Nicaragua is preferable to that in the open sea. The lake would also be of great advantage to ships—steel vessels, for instance—for the purpose of cleaning their bottoms. They can lie in fresh water, in a good climate, and in a country that is able to provide them with all sorts of stores and provisions if the country be developed.

Mr. STEWART. How deep are the rapids between the San Juan River and the San Carlos River?

Mr. MILLER. There are no rapids below, where the San Carlos comes in. The rapids are all in the portion between Toro and the San Carlos. That is free navigation [indicating on map].

Mr. BARHAM. What would be the distance of the free navigation?

Mr. MILLER. One hundred and forty-two miles of this upper route.

It would be less on the Lull route, because that contemplates putting a dam or dams farther up the river instead of putting them together 13 miles west of Greytown.

Mr. BARHAM. What would be the length of the canal, deducting the free navigation?

Mr. MILLER. Thirteen miles east of the dam and $2\frac{1}{2}$ miles on the Pacific side, making $15\frac{1}{2}$ miles; but of course we must count the cut through the summit divide from the lake west, which would be about 11 miles. We therefore have the greater part of the Nicaragua route through fresh water, and a large lake, which is already there, instead of having to build a lake, as is proposed at Panama, and which will not be used for purposes of navigation after it is built, but simply for storage purposes during the dry season.

Of course there is another element involved in the Nicaragua Canal. It lies 400 miles farther north—in the trade-wind region—than the Panama Canal.

In the question of expense of construction of course the health problem is very favorable to the Nicaragua Canal. I spent three months in Panama Bay, where we had to lie three or four miles away from the coast, where it rained the whole time, and the climate was the worst climate I think I ever felt anywhere in the world. And the Panama Canal, after it gets to the Panama Bay, has to dig a trench 3 miles out into the bay for reaching deep water; whereas, on the other hand, I spent two successive winters in Nicaragua and found the climate the usual tropical one in the region of trade winds, very much like that of Martinique, Guadeloupe, and the Sandwich Islands. Our party had a few little fevers, which are always to be expected when parties go from the United States into a tropical country; but they all got well, and we brought everyone of our party home safely. Since then anywhere from 500 to 1,500 men have been at work there, and our death rate has been smaller than the death rate in New York City.

Mr. MANN. You said that one of the reasons why the Nicaragua route was preferable to the Panama route was on account of the construction of the artificial lake. You have to construct an artificial lake also, do you not? Is not your proposition to construct an artificial lake?

Mr. MILLER. No; I do not think so.

Mr. MANN. Aren't you going to build a dam for the purpose of creating an artificial lake?

Mr. MILLER. The object is to bring this level up here [indicating on map].

Mr. MANN. You will make an artificial lake?

Mr. MILLER. This can hardly be termed a lake. The elevation is very narrow.

Mr. MANN. Don't you expect the water to back up there and make a lake?

Mr. MILLER. On the high level plan—yes; I was explaining the Lull route. The idea is to cut this hill away [indicating on map]. That dam will make a large reservoir in there—that is, by the other method. That is considered and planned to give more slack-water navigation.

Mr. HAWLEY. But you interpret the difference between the artificial lake which you have constructed and that which will be created by the Panama people to be that you will have a perpetual water supply, and yours is for the purpose of controlling and regulating it and theirs is for the purpose of housing the water and holding it to use at the season when they would not have a sufficient supply without it.

Mr. MANN. Would it be any more difficult to construct a lake for one purpose than for another?

Mr. MILLER. No, sir; except the result obtained——

Mr. MANN. In both cases you depend on the rainfall for the water used in the canal?

Mr. MILLER. No, sir; we have a great deal more water than necessary——

Mr. MANN. You depend upon the rainfall?

Mr. MILLER. Yes.

Mr. MANN. I mean you do not depend on the sea; you depend on rainfall. If the Panama people were correct about the computation of the rainfall there, would there be any engineering trouble about obtaining supply enough there for the canal? Would there be any trouble about the artificial lake?

Mr. MILLER. No, not if their reasoning is correct.

Mr. HAWLEY. I want this made clear. The lake you propose to construct by means of a dam and the storage of water there at Nicaragua has a perpetual supply to day, has it not?

Mr. MILLER. It had.

Mr. HAWLEY. You construct that lake so as to regulate the water in the canal, to keep the water from rising too high?

Mr. MILLER. Not only that——

Mr. HAWLEY. Pardon me, but what I wish to establish is the fact that the artificial lake to be built by the Panama Company is to store water which they would not otherwise have, while you will have a perpetual water supply out of that which nature has already provided.

Mr. MILLER. Yes.

Mr. STEWART. In other words, your artificial lake is not necessary to the proper carrying out of the canal, whereas the artificial lake at Panama is necessary.

Mr. MANN. Why do you build it, then, if it is not necessary?

Mr. MILLER. The object of building it——

Mr. MANN. It is necessary, then; I think I understand why you build it.

Mr. MILLER. I do not agree with you that it is not necessary to make a reservoir beyond this point here [indicating]. This is built for the purpose of giving us a further free navigation beyond that point, and it helps in curbing the large amount of water we have, and the larger reservoir you make the less rise and fall there will be in the rainy season. Of course, the more area you cover with water the less rise and fall there is.

Mr. LOVERING. Do you navigate your lakes?

Mr. MILLER. Yes, sir.

Mr. LOVERING. And they do not navigate——

Mr. MILLER. They do not use it except for storage.

A very prominent engineer, after going down there, said he looked upon this great reservoir, bringing us within 13 miles of the Atlantic, as a stroke of genius on the part of our engineer. He thought at the time it should be looked very carefully into, because we were raising the river through what appeared to be swampy land, and the question was whether it would hold it. That has since been investigated and it has been found that it would hold. But the point I make is that that reservoir is unnecessary. If the United States Government decides that that is too large a thing to attempt, then this route along the river is perfectly practicable, without storing the water at such a height.

Mr. BARHAM. That is the Lull route?

Mr. MILLER. Yes, sir. Both routes have been surveyed and carefully gone over, and both are perfectly practicable. We started with the Lull route, and we have finally come to the conclusion that it would be a better thing to take the lower route; but the upper one is just as practicable.

Mr. MANN. Has the United States commission reported it practicable?

Mr. MILLER. Yes, sir.

Mr. MANN. Which one?

Mr. MILLER. Both of them.

Mr. MANN. I understand the present commission reports that a dam be constructed on the San Juan above the junction with the San Carlos River.

Mr. MILLER. I have not heard of it.

Mr. MANN. You probably will in course of time.

Mr. MILLER. I should think it would be a very safe plan to have it there. We have no objection to it.

Mr. MANN. I can not quite understand what difference it makes whether you construct an artificial lake for one purpose or another. Of course, in the Panama scheme, in this construction of a lake for a supply of water, if it be found there is not enough water, then that plan is no good. But the trouble of constructing a lake by the dam is the same thing in one case as another.

Mr. MILLER. The engineering feature?

Mr. MANN. Yes.

Mr. MILLER. Yes, sir; of course.

Mr. MANN. It is simply a question of water supply, and that depends on the judgment of the people and the observations of the time.

Mr. MILLER. Of course there is no doubt about the water supply at Nicaragua.

Mr. MANN. Is there at Panama?

Mr. MILLER. I think so.

Mr. MANN. I don't know. I have heard that objection raised by several of you gentlemen on that point.

Mr. MILLER. We think so.

Mr. MANN. If you have any statement as to the amount of water supply of the Panama Canal to show that the rainfall will not supply the artificial lake, that is something very pertinent for the committee to hear.

Mr. MILLER. I think it is very likely, from my knowledge of the Chagres River, which I have seen rise 30 or 40 feet in a night, that they will get too much—

Mr. BARHAM. You say you have seen that river rise 30 or 40 feet in a night?

Mr. MILLER. I will not say in a night; in twenty-four hours.

Mr. BARHAM. Did you hear the statements of the Panama people?

Mr. MILLER. We propose to eliminate the rush of water by spreading it over these two lakes.

Mr. MANN. I suppose I am not qualified to form a judgment about such matters, but they give figures based on observations running over years—

Mr. MILLER. I think it can be done. They can build those dams, and store that enormous amount of water in the interior of the country, in a safe condition, if they spend enough money.

Mr. MANN. As I remember the testimony given, those two artificial lakes could be constructed, so far as the cost of the locks and dams is

concerned, for four or five million dollars. Would you want to give your judgment on that?

Mr. MILLER. No, sir; I have not looked into that enough to give an opinion on that. I think that is about all I have to say.

Mr. BARHAM. I would like to know if you could give an estimate of the value, in the event the canal is constructed over this Nicaraguan route, of the work which has already been done there. What would it be worth now to a party that would take it in hand—the project, the surveys, the actual work, the excavation that has been done there?

Mr. MILLER. Replying to that, of course since the years 1893 and 1895 we have dropped everything but absolutely necessary maintenance and what we had down there—stopped all our work. During all that time the property has more or less depreciated. The canal we built for the first few miles there and the breakwater remain in pretty good condition. The railroad, 10 miles long, is in pretty good condition. The houses have more or less deteriorated. The telegraph which we built is still there. The lands which we purchased are still there. The locomotives are in pretty good condition. The dredges, I suppose, would not be used by the new company. They were excellent dredges at the time of their being built, but present contractors use much better ones. There were several million dollars spent during the first few years there. The surveys themselves represent over \$1,000,000 of expenditure.

Taking the basis of the Lull survey, we sent parties all through this region here [indicating on map], everywhere through it; we sent parties to San Carlos to determine the flowing. We sent parties here to see if that was a better region [indicating on map], and anyone who has been in the Tropics knows how expensive surveying is in that country. It is necessary to cut a way through a wall of verdure everywhere. Those surveys remain for whoever goes to take the project up. It is a pretty difficult thing to base it on a commercial value.

A party of gentlemen interested in the Nicaragua Canal in 1886, naval officers principally, took hold of this thing and put their money in it. Among them were Captain Evans and Captain Taylor and Colonel Crowninshield, who is now Chief of the Bureau of Navigation, and Judge Daily, and Mr. Billings, of the Northern Pacific, Mr. Carnegie, and 50 others I could mention. They went into this matter as a venture, hoping of course they could realize profits, but keeping the canal for the United States of America. At this time the Panama Canal was very active. Mr. de Lesseps had said that Panama was the only place to build a canal. He had said that a lock canal could not be built, but that if a lock canal could be built it should not be built at Panama, but at Nicaragua. The time has come when they have to build a lock canal, and they now say de Lesseps was wrong. They have to build a lock canal there at Panama if they build a canal at all. They have to say that to keep their scheme alive.

As Senator Miller has told you the history of the earlier part of this organization, I will not dwell on that. We have simply kept waiting along until the United States Government should say whether or not they wanted to build the canal, and the time seems now to have arrived, and whatever is given to this company is on a basis of equity on the amount of money these gentlemen have put into it to keep it intact for the United States of America.

Probably it is difficult for you gentlemen to appreciate the many propositions and demands which the company has had for transferring our concessions and rights to foreign corporations and syndicates. We

naturally wish to make a commercial success of the project, but in some cases felt that there was danger to the United States in foreign capital, and in one instance felt certain that the Panama Company wished to obtain our concessions simply for the sake of stopping work at Nicaragua.

Mr. BARHAM. Don't you care to answer the question as to what that which has been done would be worth?

Mr. MILLER. I think it would be worth one thing if a corporation took hold and an entirely different thing if the United States took hold.

Mr. BARHAM. Put it the United States, then.

Mr. MILLER. There would be this proposition in the first place. If they wanted to get a new treaty it would take quite a time to do it. In the second place, those governments, realizing that the whole United States was back of the thing, would ask them more for the concessions than we had to pay, and it would cost the Government ultimately a great deal more than \$5,000,000 to start afresh than to start with all the data and concessions and all the machinery and all the knowledge the old company has of the status in this case.

Mr. STEWART. Is it proposed by the Grace syndicate to repay the Maritime Canal Company if their concessions should lapse?

Mr. MILLER. I have never heard anything to that effect.

Mr. STEWART. They propose to go right on using the assets of the Maritime Canal Company without paying them anything?

Mr. MILLER. I do not know what they intend. I have never asked them.

Mr. STEWART. They could ignore the shareholders?

Mr. MILLER. Yes, sir.

Mr. STEWART. And that is what they propose to do, don't you think?

Mr. MILLER. I would not like to say. They went in there as a business proposition, from a purely business point of view.

Mr. BARHAM. Do you think the Government of the United States would have any trouble in getting a concession from Costa Rica to build a canal through there; and, if so, how much money would it cost, in your judgment?

Mr. MILLER. I think they would have difficulty to own any land down there with the present feeling. I think it would cost the Government a large amount of money. I can not say what, if they went to Nicaragua on the basis of alienating any of their lands. Of course, that is a matter of diplomacy which will take time. I think the element of time is a great one now.

Mr. HAWLEY. What do you mean by the present feeling—

Mr. MILLER. In the papers?

Mr. HAWLEY. You have not been there lately?

Mr. MILLER. I have not been there since 1873.

Mr. MANN. You say you think the element of time is very important now?

Mr. MILLER. Yes, sir; I think the United States is ready now, and ought to have it.

Mr. MANN. Is it not as important to the Government of Nicaragua as it is to the United States?

Mr. MILLER. To have a canal?

Mr. MANN. The question of time.

Mr. MILLER. I think it is vitally more important to the United States than it is to Nicaragua to have a canal as quickly as possible, because our interests are so vastly superior to those of Nicaragua.

Mr. MANN. Do you think the interests of the United States are more with reference to what they have than to the interests of Nicaragua?

Mr. MILLER. Yes, sir; I think so.

Mr. MANN. You think this would give a greater benefit proportionately to the people of the United States than to the people of Nicaragua?

Mr. MILLER. Proportionate to the number of people?

Mr. MANN. Yes.

Mr. MILLER. No, sir; I do not know that I would say that.

Mr. MANN. Hasn't it been as important for the Government of Nicaragua for the last ten years?

Mr. MILLER. Yes.

Mr. MANN. If the question of time is so important to Nicaragua, don't you think you have a right to consider that in the question of extending your concession?

Mr. MILLER. I don't think I quite understand your meaning.

Mr. MANN. Your concession provides in its terms, as claimed, for ending in October, 1899?

Mr. MILLER. The Nicaraguan concession?

Mr. MANN. Yes. If the question of time is so important now, wouldn't they have a right to say that because this canal has not been carried on they have a right to end that concession?

Mr. MILLER. I suppose any nation has a right to say a thing like that, that that is a sovereign right of the nation. That brings out one point which I have failed to mention. It has been brought out before, however. That point is that from the San Carlos down, Costa Rica has a right to anything that is done in this region up to Greytown Harbor [indicating on map].

The CHAIRMAN. Do you know how far the territory of Nicaragua extends south of the river between the San Carlos and the lake?

Mr. MILLER. Beginning here [indicating on map], the boundary line runs across Salinas Bay and then follows 3 miles back of the lake to San Quilo, and from there down Costa Rica owns the banks and has in effect rights through the river and through the lake. She owns to the river below this point [indicating on map], and also the award which was given by President Cleveland was an award assuming that this old river bed, the San Juanillo, was the original river bed, for all purposes of the treaty.

The CHAIRMAN. Suppose the Ochoa dam should be built at the site proposed, at the height proposed, by the Maritime Canal Company, what portion of that territory of Nicaragua lying south of the river would be flooded—that strip of 3 miles which you spoke of?

Mr. MILLER. If the dam was put across here in that region?

The CHAIRMAN. At Ochoa.

Mr. MILLER (continuing). It would flow into Costa Rican territory here in certain portions [indicating on map].

The CHAIRMAN. That is not my question. What I want to get at is this: You say the boundary of Nicaragua is 3 miles south of the river along that stretch of the river. Now, what proportion of the territory belonging to Nicaragua would be overflowed in case the Ochoa dam should be built to the height of 90 feet?

Mr. MILLER. The 3-mile point begins at Castillo.

The CHAIRMAN. From Castillo up?

Mr. MILLER. I should think the whole of it would be along here [indicating on map]. It would probably go back into Costa Rica. From Castillo up to about 9 miles there are high hills along here [indicating on map]. From Castillo up toward the lake, about 9 miles,

those hills will be found. I doubt if water would get above there [indicating on map], but along here, except for a few miles, it would probably flow into Costa Rican territory.

Mr. CHAIRMAN. Substantially all of Nicaragua south of the river would be overflowed in case the Ochoa dam should be built?

Mr. MILLER. Pretty much.

The CHAIRMAN. Would there be any arable land overflowed?

Mr. MILLER. Above Castillo, as I recollect it, it would only be raised say 10 feet.

Mr. STEWART. That is not arable land?

Mr. MILLER. They use that kind of land for banana planting and at sort of thing—rubber.

Mr. BARHAM. That hill land? Do they cultivate that hill land?

Mr. MILLER. Not now; none of it is cultivated.

Mr. HAWLEY. Would you feel by either of the routes you have described or any route by which this canal would be practicable, that you could construct it and maintain it without the consent of Costa Rica?

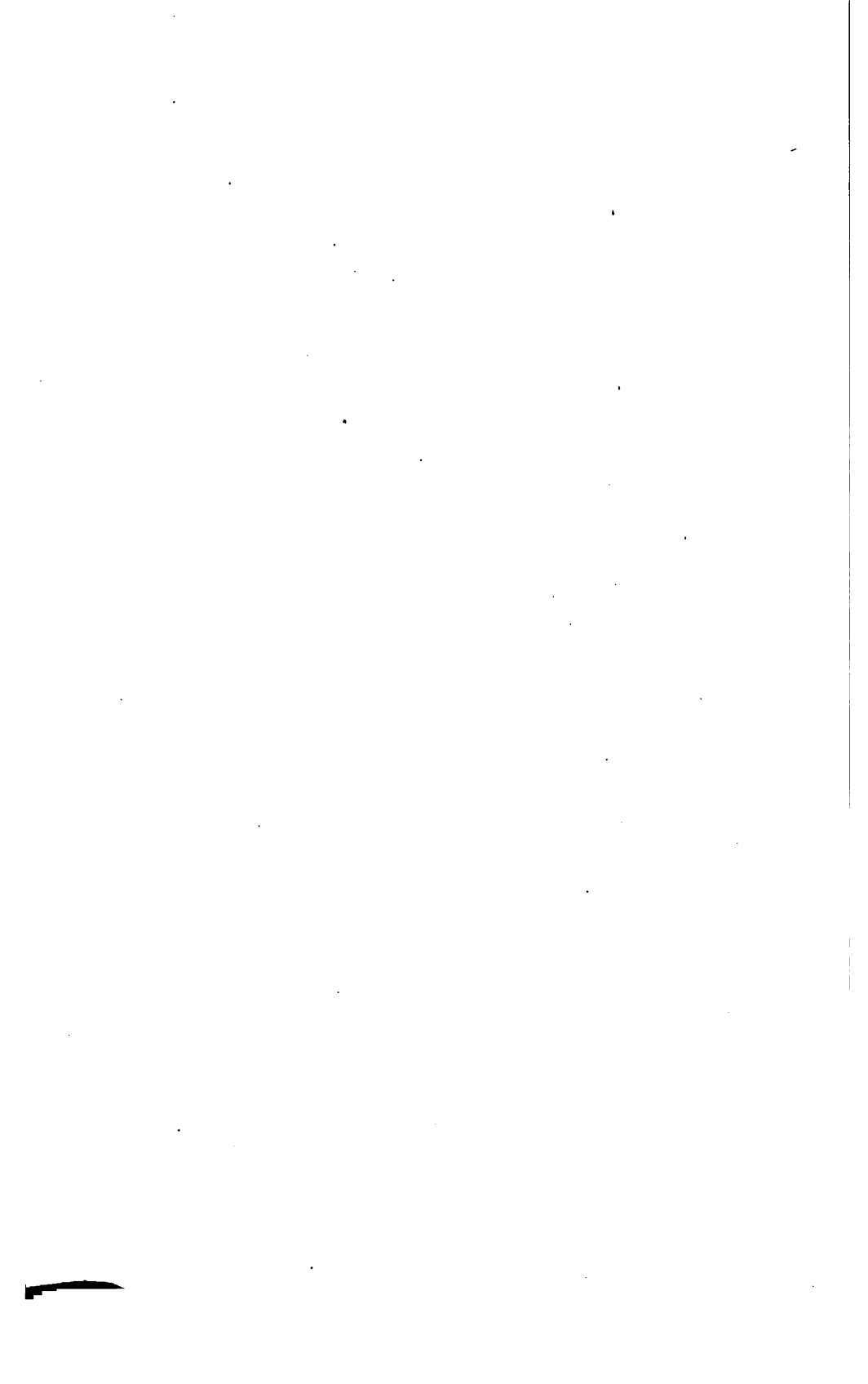
Mr. MILLER. No, sir. Of course not, sir.

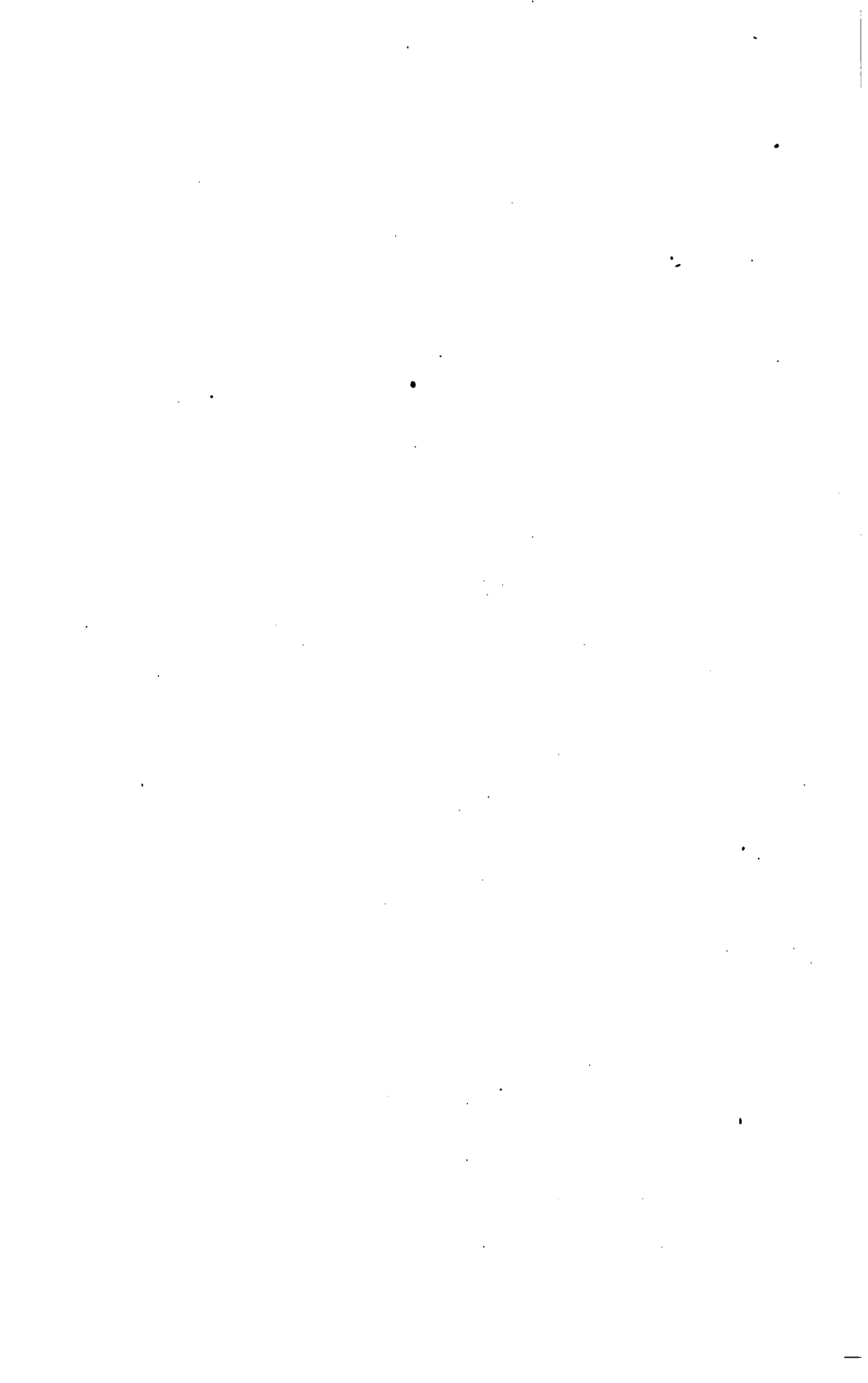
Mr. HAWLEY. As a universal proposition, can the Nicaragua Canal as planned and devised, by any party that has never had charge of it, be constructed and maintained without the consent of Costa Rica?

Mr. MILLER. Undoubtedly not. Even if they took the upper level they would invade Costa Rica.

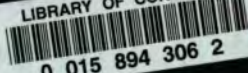
(Thereupon at 3 o'clock p. m., the committee adjourned.)

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